# RECOGNIZING FACIAL EXPRESSION OF EMOTIONS: ASSESSMENT, TRAINING AND GENERALIZATION IN MENTALLY RETARDED PERSONS

Christopher McAlpine

A thesis

submitted in partial fulfillment

of the requirements for the Degree of

MASTER OF ARTS IN PSYCHOLOGY

University of Canterbury

January 1986

CONTENTS

# ACKNOWLEDGEMENTS

I am deeply indebted to my supervisor, Dr Nirbhay N. Singh, for his support, enthusiasm and guidance which helped to make this thesis a truly valuable learning experience. I am also grateful to the staff of Ferndale, Ilam, Hogben and Allenvale Schools. Thanks also to the staff of Templeton Hospital and Training School. Special thanks to the staff of Marshlands Road I.H.C. and in particular the staff at Ferry Road I.H.C.

I am indebted to Trish Ross for her assistance, support, encouragement and threats during the preparation and completion of this thesis.

My humble thanks are extended to the many mentally retarded persons who helped make the preparation of this thesis a memorable experience.

# ABSTRACT

Being able to recognize facial expressions of emotion is an important social skill. For the majority of people this skill is learnt incidentally in social situations. However for a small minority of people, such as the mentally retarded, this skill needs to be systematically taught. The present studies investigated the abilities of mentally retarded persons in recognizing six basic facial expressions of emotion (happiness, sadness, disgust, surprise, fear and anger.)

A series of four studies are reported. In study 1, the accuracy of 373 mentally retarded children and adults and 128 non-retarded children at recognizing the six basic facial expressions of emotion was investigated. Mentally retarded children and adults were not as accurate at recognizing facial expressions of emotion as non-retarded persons. Study 2 compared 20 mildly and 20 moderately retarded children and 20 mildly and 20 moderately retarded adults with non-retarded mental age and sex controls. A two-way analysis of variance showed all four groups of retarded subjects were significantly less accurate (at the .001 level) in their recognition of facial expressions of emotion compared with their matched controls. Study 3 details the construction or a generalization probe protraying role plays of the six basic emotions. In study 4, seven mentally retarded adults were taught to recognize six basic facial expressions of emotion. A multiple baseline across subjects design was used incorporating a generalization probe. Mentally retarded adults were trained using overcorrection and education with regard to the muscular movements which relate to specific emotions. The training study

demonstrated that young mentally retarded adults could be taught to improve in their ability to recognize facial expressions of emotion. Response generalization was measured across photographs and video presentations.

# CHAPTER 1: GENERAL INTRODUCTION

## Recognition of emotion and social skills training

The ability to recognise facial expressions of emotion is a skill most of us would claim to possess to varying degrees. Such skills are not formally taught and typically are taken for granted until perhaps one misreads another's facial expression of an emotion.

Competence in recognizing emotions is considered to be an important skill in social behaviour and interpersonal relationships (Borke 1971; Camras, Grow & Ribordy 1983; Edwards, Manstead & MacDonald 1984; Field & Walden 1982; Gottman, Gonso & Rasmussen 1975; Gray, Fraser & Leuder 1983; Harrigan 1984; Hughes, Tingle & Sawin 1981; Morrison & Bellack 1981; Robertson, Richardson & Youngson 1984; Rothenberg 1970; Walden & Field 1982). Obviously verbal communication is important in this regard, but is is essential that one is also able to accurately interpret non-verbal cues (Mehrabian, 1972). With respect to interpersonal communication between young children and others with less sophisticated verbal skills, the ability to recognize facial expressions is a critical component in comprehending communication about affect (Harrigan, 1984). Furthermore, the recognition of facial expressions of emotion plays an important role in empathic responding (Camras et al., 1983). Finally, it has been suggested that facial expressions "are an important source of information about people in the world around us, and learning to discriminate among the many expressions that one sees on the faces of others is a basic task of person perceptions" (Walden

& Field, 1982, p.1312).

Mentally retarded persons are generally considered to be poor at recognizing emotions in others (Fraser & Grieve 1981; Gray, et al., 1983; Robertson et al., 1984). However, only two studies have focussed on the ability of mentally retarded persons to recognize facial expressions of emotion. Levy, Orr and Rosenzweig (1960) found a significant difference between retarded and non-retarded subjects in their ability to identify emotions along a happiness-unhappiness scale. Gray et al., (1983) focussing on discrete facial expressions of emotion, found that the ability of mildly and moderately retarded subjects to recognize six basic facial expressions (happiness, sadness, disgust, fear, surprise, anger) was positively correlated with intelligence.

The dearth of studies examining the abilities of mentally retarded persons in recognising facial expressions of emotion is hardly surprising considering the controversy that has surrounded the area of the recognition of facial expressions of emotion (see Ekman & Ellsworth 1972; Izard 1971). A number of investigators have concluded that there are no reliable patterns of facial expressions of different emotional states (Bruner & Tagiuri 1954; Landis 1924, 1929; Sherman 1927). Recently, however such claims have been disputed and evidence supporting specificity in facial expressions has been presented (Ekman 1982; Ekman & Oster 1979, Izard, 1971, 1977). The ability to recognize and/or correctly label facial expressions of emotion can be seen as one facet of social skills training. Many definitions of social skills have been proposed, some of them relevant to specific populations with skill deficits, while others tend to be general and

non-specific (O'Malley, 1977; Singh & Winton, 1983). The term social skills training usually refers to competence in self-care; communication and interpersonal skills. The range of skill deficits which may be included in social skills training is so broad that the term may be redundant. (Singh & Winton, 1983).

Only interpersonal behaviour as a facet of social skills is directly relevant to the present discussion. A number of models of interpersonal behaviour with regard to mentally retarded persons have been proposed (see Bernstein 1981, Wehman 1975). Argyle and Kendon (1967) have suggested that interpersonal skills can be seen as consisting of perception, cognition, performance, motivation, and performance feedback. It is likely that the mentally retarded may suffer particular problems with each of these components although they may have particular problems in the area of perceptual and attentional skills. (Robertson et al., 1984). This can pose serious problems to mentally retarded persons since these two skills are important in gathering verbal and non-verbal information necessary for social interaction.

In Morrison and Bellack's (1981) view the traditional approach to social skills training (focussing on the behavioural response) is partly responsible for the failure of social skills training programmes to adequately address issues of generalization. It seems reasonable to argue that adequate social performance requires not only a repertoire of response skills, but knowledge about <u>when</u> and <u>how</u> these responses should be applied. Application of such knowledge depends upon the ability to accurately read the social environment. Clearly, the ability to

accurately identify emotions is a necessary skill if the individual is to perform effectively in the social environment. Indeed, if newly acquired response skills are to enable subjects to generalize to new situations, subjects must be taught when and how these responses should be used.

The recognition of emotion is a complex process ranging from the ability to recognize facial expressions of emotion to the attitudes one has about life. For example, Frijda (1969) has specified 13 steps considered to be involved in the process:

> "(1) The understanding of a situation and its implications. (2) A store containing factual and emotional implications; many possible emotions connected with varying probabilities assigned to each situation. (3) We are 'set' for a person in a situation to experience a particular emotion. (4) A store of emotional knowledge; emotions and their scale values - from which we also get our own emotional expression. (5) The system must be able to register expressive behaviour and code it. (6) A working out of expressive meaning. (7) A comparison of expressive meaning and situational suggestions. (8) A combination of (4) and (6). (9) An emotion is selected from the store in (4). (10) An adjustment is made if the selected emotion does not conform to expectations. (11) A mechanism to resolve any continuing discordance. (12) The selected mechanism then defines a new emotion. (13) Finally, there is a construction of situational components to fit with the selected emotion". (Strongman 1978, p.228).

Clearly, recognizing expressed emotions is a complex process. The ability to recognize facial expressions of emotion is but one part of the process involved in making a decision as to what emotion is portrayed. This ability is important in comprehending communication about emotions; it plays an important role in empathic responding; and has relevance to social behaviour and interpersonal relationships.

## Theoretical Background

After the publication of Darwin's (1872) now famous book The Expressions of Emotions, controversy surrounded the issue of whether there were facial expressions which related specificially to discrete emotional states. Amidst this controversey, a positive line of research was to emerge from the study of broad dimensions of emotional response. Woodworth and Scholsberg (1954) demonstrated that facial expressions of emotion could be reliably rated along a pleasantness-unpleasantness dimension. Overall, this line of research has shown that qualitatively discrete emotions can be presented as points or clusters of points in multi-dimensional space.

Numerous theories of emotion have been proposed (see Strongman, 1978). While a discussion of various theories is not relevant here, a brief explanation of the relationship between emotion and facial expressions is pertinent. In particular, two theories of emotion which have strong, yet divergent, views on facial expressions and their relation to emotion are discussed.

Mandler's views of emotion can be closely identified with cognitive psychology (Izard, 1984; Mandler 1982). Briefly, Mandler (1982) views emotional experiences as the outcome of two separate, but not necessarily independent, processes and mechanisms. These are global autonomic (visceral) arousal and cognitive evaluations. He states that global arousal determines the intensity, while cognitive evaluations determine the quality of emotional experience. Cognitive evaluations are viewed as processes whereby the

human mental system perceives, categorizes, constructs and evaluates its internal and external environment. Mandler (1982) argues against any system of emotional state that requires an innate, unlearned, fundamental emotional repertoire. However, he does make allowances for innate aversive and pleasurable events or states that contribute to the construction of the emotional state.

Arguing against what he calls conventional wisdom, Mandler does not accept "facial expressions to be the necessary consequences of some innate primary affect or the mere expression of some prior fundamental or constructed emotional state". (Mandler 1976, p.238). While accepting a degree of universality of facial expressions, Mandler views such evidence "as an ancient system of communication (probably pre-linguistic), that is used to code and communicate major categories of human experience - namely cognitive evaluations" (Mandler 1976, p.238). He parallels facial expressions to language because, like language, facial expressions can occur in the absence of any emotional state. The function of such expressions he suggests is evaluative communication.

Differential emotion theory developed out of the work of Tomkins (Izard, 1971, 1977; Izard & Tomkins, 1966; Tomkins, 1962, 1963). Tomkins and Izard suggest that there are separate inantely programmed neural mechanisms for each of the fundamental emotions, They also suggest that the conscious experience of emotions results from the cortical integration of facial feedback which can occur without cognitive mediation. With regard to the expressive component of emotion Izard (1971, 1977) focusses largely on facial activity, although he does include provision for other bodily responses

such as postural - gestural, visual-glandular and vocal expressions. While still placing emphasis on the face as the central site of the affect response and feedback, Tomkins (1982) has shifted attention from the facial muscles to the skin as being of greatest importance in producing the feeling of affect. It is worth noting that in Tomkins's (1982) view the communication of affect is a secondary spin-off function rather than the primary function of emotions. Izard, Tomkins and Mandler differin their views on what causes the experience of emotion. While such questions are pertinent to a discussion of emotion in general and have some relevance to the topic under discussion, the present discussion will focus specificially on the communication aspect of facial expressions.

Izard, Tomkins and Mandler all accept a degree of universality in facial expressions of emotion, although Mandler (1976) suggests fewer than 10 emotions proposed by Izard (1971, 1977). Whether one sees facial expressions of emotion as primitive communication devices or as separate, innately programmed neural mechanisms (involving facial feedback) will largely depend on one's theoretical bias since the evidence is not clear. Arguably the two theories may not be as incompatible as first might appear and may simply be addressing different aspects of the same phenomenon.

Speculation aside, what is becoming clear from neurological investigations is that different neurological pathways are involved in the production of voluntary and spontaneously produced facial expressions. Rinn (1984) has suggested that posed or voluntary expressions use cortical (pyramidal) circuits and that spontaneous expressions are essentially extra-pyramidal in origin. This supports the

claims of Izard, Mandler and Tomkins that the face is under joint command of the voluntary and involuntary nervous system. Clearly the two systems interact in a complex manner.

At this point, it is necessary to consider the role of communicating emotion in everyday life situations. Obviously the ability to recognize emotions involves more than the mere recognition of facial expression and, indeed, Tomkins (1982) has stated that we rarely see a purely innate involuntary affective response on the face. He goes on to suggest that we are socialized against directly expressing negative emotions. Izard (1982) would argue that patterns of emotion are more frequently observed than pure emotions. With regard to the frequency of facial expressions of emotion, Tomkins (1982) has argued that a purely voluntary response is more frequently observed than a purely innate involuntary affective response. He has suggested that such voluntary responses can serve a number of purposes; for example, to deceive another, to praise another, to control another, and so forth. Tomkins (1982) warns that because facial behaviour is partly under voluntary control its meaning is as ambiguous as any other behaviour and that we therefore interpret facial expressions at our peril. Clearly there is a need to study emotions as they are expressed in everyday life to address these issues.

Theories of emotion have paid little attention to the role of socialization in the development of facial expressions of emotion. A notable exception is the theory of Lewis and Michalson (1985) who suggested that

> "there is not necessarily an isomorphic relationship among emotional elicitors, states and expressions. In fact, we would argue that emotional expressions are a function of both a complex neuromusculature involving facial, bodily and vocal responses as well as the socialization roles governing these behaviours in any particular society. " (Lewis & Michalson 1985, p.158).

They describe three stages of expression development. They suggest that in the first stage there is no innate co-ordination of states and the behaviours that express them. Socialization in rules about what to feel and how to express those feelings largely brings about the co-ordination, in the second stage, of state and the expression of state. In the final stage, state and expression become disconnected. Therefore, through socialization voluntary control of expressive behaviour is gained.

The influence of socialization in the development of expression was demonstrated in a study by Malatesta and Haviland (1982). They examined mother and child interactions to determine whether modelling and contingent responding was occurring in early infancy and what its short-term effects on infant expression might be. They found changes occurring in early infancy that are indicative of instruction in facial display. Furthermore, the behaviour of mothers was seen as attempts to moderate the emotional expressions of their infants. Malatesta and Haviland (1982) suggested that "there is evidence that mother-infant interaction could account for the direction of change in display acquisition in accord with hypothesized group gender and familial demands" (Malatesta & Haviland 1982).

Whether facial expressions of emotion are seen as an ancient system of communication that is used to communicate major categories of human experience (cognitive evaluations)

or purely innate involuntary affective responses in the face, or just voluntarily produced expressions, does not alter the fact that they have shared meaning. Furthermore, the accurate interpretation of these expressions would seem vital as one aspect of the skills necessary for effective communication and social interaction.

## Does the face provide accurate information about emotion?

At a common sense level a majority of people would claim to be able to "read" emotions from facial expressions. However at an empirical level psychologists have yet to reach consensus on whether the face provides accurate information about emotion. Accuracy in this matter has been defined as

> "correct information of some nature being obtained by some means from facial behaviour. As such, accuracy does not necessarily entail accurate information about emotion: in addition to the finding of accuracy, relevance of the accuracy to some aspect of the phenomena described as emotional must be demonstrated." (Ekman 1982, p.56).

According to Izard (1971) and Ekman et al. (1972), the doubt surrounding the issue as to whether accurate information about emotion can be obtained from facial expressions is largely unfounded. Ekman (1982) has claimed that influential textbook writers such as Bruner and Tagiuri (1954) were factually incorrect and misleading in their reviews of the literature. Along similar lines Izard (1971) has suggested that various writers have reviewed more or less the same body of literature yet arrived at opposing conclusions, in part because of their own biases and the current beliefs at the time of writing (e.g., a pro- or anti-Darwinian sentiment).

In a major review of these early studies, Ekman (1982)

attributed many of the negative findings to a number of methodological weaknesses. These included inadequacy in selection of eliciting circumstances, sampling of subjects, methods of recording, sampling behaviours from a record and sampling emotions.

In summarizing the literature up until 1977, Ekman (1982) concluded that accuracy levels exceed chance for both posed and spontaneous behaviour. Studies using posed expressions were able to obtain accuracy rates better than chance for the discrete emotions (happiness, sadness, anger, fear, surprise and disgust). When these studies were examined collectively many of the methodological weaknesses were minimized. For example, studies in which the sample consisted of only a few subjects have little claim to generality across persons. However when several of these studies are viewed collectively there exists a firmer base for such a claim.

Ekman (1982) suggested that despite previous reviews which state the field is contradictory and confusing, his re-analysis of these studies showed consistent evidence of accurate judgements of emotion from facial expressions. However, Ekman (1982) has emphasized that a sound methodological study has yet to be conducted to establish the link between posed expressions and spontaneous behaviour. Furthermore, he suggested that is unnecessary to continue to question whether accurate judgements are possible given the outcome of his re-analysis of the apparently contradictory research to date. Ekman (1982) does underscore the fact that other factors (such as type of task, choice of responses, order of presentation and type of response subjects can make) influence recognition.

By providing a sound conceptual and methodological framework, Ekman and his colleagues brought an enthusiasm and optimism for further investigation in the area. As a consequence a number of studies have been undertaken and the results support Ekman's (1982) claim that accurate judgements of facial expressions of emotion are possible.

The first line of supportive evidence is derived from studies of spontaneous expressions (Hiatt, Campos & Emde 1979; Izard, Huebner, Risser, McGinness & Dougherty 1980; Stenberg, Campos, & Emde 1983). While emotions were artificially elicited, situations were similar to everyday life events. These studies provide an important link between the generalization of posed expressions and that of spontaneous expressions. Further supportive evidence is derived from studies investigating methodological issues (Anderson & Buller 1981; Harrigan 1984; Knudsen & Muzekari 1980; Thayer 1979), and from studies comparing clinical populations with normal subjects (Camras et al. (1983); Edwards et al. 1984; Muzekari & Bates 1977; Vosk, Forehand & Figueroa 1983; Walker, McGuire & Bettes 1984; Walker, Marwit & Emory 1980). While accuracy was not the specific focus of their research, the following found evidence of accuracy of discrete emotions at better than chance levels (Carlson, Gantz & Masters 1983; Felleman, Barden, Carlson, Rosenberg, Masters 1983; Field & Walden 1982; Leathers & Emigh 1980; Reichenbach & Masters 1983).

Clearly, accurate recognition of facial expressions is possible. However, what is not clear in many of the studies cited is the theoretical basis for the link between emotional states and discrete facial expressions.

## Cross-cultural studies of facial expressions of emotion

For more than a century, speculation and controversy has surrounded the question of universals in the face and emotion. Darwin (1872) was one of the first to propose that there are universal face expressions for each emotion. Such a deduction was made on the basis of his evolutionary theory. Similarly, Allport (1924), Asch (1952), and Tomkins (1962,1963) theorized universals in the facial expression of emotion. In contrast La Barre (1947), using personal impressions, descriptions of novelists and anthropological reports, implied that facial expressions of emotion were socially learnt and culturally variable. However, the value of these interpretations is limited without the support of quantitative data.

Two early empirical studies (Dickey & Knower 1941; Trandis & Lambert 1958) found evidence for the notion of universal facial expressions for each basic emotion. A weakness in both studies was the limited number of stimulus persons used (two and one persons, respectively). Recently a number of cross-cultural studies have given considerable support to the claim that facial expressions of emotion are universal (Boucher & Carlson 1980; Ducci, Arcuri, Georgis & Sineshaw 1982; Ekman & Friesen 1971; Ekman et al., 1972; Ekman, Sorenson & Friesen 1969). Typically, these studies compare a preliterate culture (e.g. Neolithic New Guinean Tribe) with a Western culture on an emotion recognition task. The results provide supportive evidence for the claim of universals in emotion recognition.

Those who claim that facial expressions of emotion are not universal argue that the relationship between

specific emotions and facial expressions is learned in a fashion that varies within each culture or subculture. Consequently, facial expressions are seen as part of the human gestural system and are acquired through social learning. It is also argued that the majority of cross-cultural studies have not eliminated the possibility that social learning influenced the observers' judgements.

Cross-cultural studies have often used facial expressions of North Americans. The possibility that facial expressions are socially learnt, due to the high degree of personal and media contact with North Americans, cannot be eliminated. Similarly a number of studies compared Western cultures which, it could be argued, share many aspects of North American culture including aspects of facial expressions of emotion. An additional methological criticism that can be levelled at most of the cross-cultural studies is that few have used a free response task. Typically subjects have been required, in a forced-choice situation, to choose from a list of alternatives. Arguably such a procedure limits cross-cultural variability.

In a series of three experiments, Boucher and Carlson (1980) demonstrated that facial expressions can communicate accurate information about emotion to observers in different cultures. Briefly, the procedures entailed (1) American and Malay observers judging expressions of Americans and Malaysians; (2) Malay observers using either a free-response task or a limited response task; and (3) Temuan Aborigine observers judging American expressions. The incorporation of the free response task in the second experiment makes a social learning explanation of the results unlikely.

Ekman and Friesen (1971) compared members of Western cultures with members of an isolated, neolithic material culture in the highlands of New Guinea in their ability to recognise facial expressions of emotion. They used a limited response task which may have limited the potential for cross-cultural variability to occur. The results provided evidence in support of their hypothesis that the association between particular facial muscular patterns and discrete emotions is universal. A social learning explanation of the results seems unlikely as the various cultures had virtually no opportunity of learning the other cultures' facial expressions. The New Guinean subjects were given an easier task than the Western subjects, but Ducci et al. (1982) have argued that the effects of the easier task were probably counter-balanced by the greater familiarity of the Western subjects with Western facial expressions. An additional bias which may have inflated the results involves one of the stories read to the New Guinean subjects. The story was "he/or she is looking at something which smells bad" (Ekman & Friesen 1971). Since direct attention is focussed on the nose region, it is possible that as a consequence, accurate identification may have been made easier.

A further experiment by Ekman and Friesen (1971) showed that facial expressions of New Guinean subjects were accurately recognized by members of a literate culture (American). Unfortunately, no criteria for the sampling of the photographed New Guinean faces used as the dependent variable were given thus limiting the generality of the findings.

Indirect support can be derived from the results of the cross-cultural study by Boucher and Brandt (1981).

These authors found that 30 American subjects could accurately identify emotions which American and Malay informants stated to be antecedent to specific emotions.

A study by Kilbride and Yarczower (1980) found that accuracy and intensity of voluntary produced facial expressions varied for both Zambian and American cultures when another person was present as opposed to producing the expression when they were alone.

In sum, the ability to recognize basic facial expressions of emotion can be seen as a universal skill. Whether such expressions are related to specific emotions or part of the human gestural system has yet to be conclusively demonstrated.

## Approaches to the study of facial expressions of emotion

The judgement and component approaches have dominated the study of facial expressions of emotion. The judgement approach treats facial expression as a stimulus, in which observers judge a subject's face to determine whether a discrete expression is recognized, or if they can distinguish among facial expressions which are emitted under different emotional states or circumstances. The component approach treats the face as a response and is concerned with the relationship between a given facial movement or position and an individual's emotional state or circumstance.

The judgement approach Historically, the judgement approach has been used by investigators more frequently than the component approach. Two judgement procedures an emotion category task and a

dimension task have typically been used in the study of facial expressions of emotion. The two tasks reflect two distinct viewpoints regarding facial expressions of emotion.

The first viewpoint postulates a set of basic categories or primary affects. In reviewing the categories proposed by five researchers (Frijda 1958; Osgood 1966; Plutchik 1962; Tomkins & McCarter 1964; Woodworth 1938), Ekman (1982) found seven categories which consistently emerged across the five studies. These are: happiness, surprise, fear, sadness, anger, disguist/contempt and interest. Ekman (1982) has suggested that these seven categories should serve as a guideline for researchers working in the area. However, conclusions with regard to the number of categories to use are limited to posed facial expressions of emotion, as a sound study is yet to be conducted using spontaneous facial expressions of emotion.

When using an emotion category task, typically subjects are asked to provide verbal labels for the emotions expressed. Alternatively they are read a story and then required to point to the target emotion portrayed in a photograph, or they may be required to match one set of photographs against another. However, variations between studies in the task given, the responses which are required and the type and number of stimuli presented limit the conclusions which can be drawn. The recent findings of Anderson and Buller (1981) highlight the need for research into the methodology of studies using an emotion category task. These authors found the number of alternative choices of emotions provided to subjects were inversely related to the accuracy of correctly identifying facial expressions. They concluded that their results supported and qualified

the previous work of Ekman and associates.

The second judgement task involves dimensions. In contrast to category theorists, dimension theorists postulate that facial edpressions of emotion can best be described and presented as points located on a small set of continuous scales or dimensions. Typically, subjects are asked to judge faces on some set of scales or they may be required to rate pairs of stimuli in terms of global similarity. However, there is some controversy with regard to the number of dimensions which are necessary Schlosberg (1954) has argued that three dimensions (intensity, pleasant/unpleasant, attention/rejection) describe the full range of facial expressions of emotion, whereas Frijda (1969) has argued that there must be at least five dimensions.

In spite of the popularity and frequent use of the judgement approach (utilising either a category or dimension task) there are a number of problems that have to be addressed. For example, a number of factors can account for error in the global judgements of untrained judges, including the context, cognitive information, or one's attitude about life in general. While bearing in mind that there are these limitations, the judgement approach is useful in determining consensus on facial expressions and as such can be used in conjunction with the component approach.

The Component Approach As discussed, the component approach treats the face as a response and is concerned with the relationship between a given facial movement or position and an individual's emotional state or circumstance. A number of investigators (e.g. Ekman & Friesen, 1978; Trois-

Wittman, 1930; Fulcher, 1942; Izard, 1982; Landis, 1924; Thompson, 1941) have attempted to measure the face directly; that is, to identify facial movements which signal a specific emotion. A difficulty for investigators has been the lack of agreement on a method of measuring facial behaviour. This has resulted in investigators having to develop their own systems of measuring facial behaviour.

Ekman, Friesen and Tomkins (1971) developed the FAST (Facial Action Scoring Technique) and Izard (1982) the MAX (Maximally Discriminative Facial Movement Coding) to differentiate the fundamental emotions. Recently, a more comprehensive system was developed by Ekman and Friesen (1978) called FACS (Facial Action Coding System) which can be used to distinguish all possible visual facial movements.

Izard and Dougherty (1982) developed AFFEX (Affect Expressions by Holistic Judgements) primarily for measuring facial expressions of emotion in infants. Prior to using AFFEX subjects had to demonstrate competence in MAX. AFFEX is a system which involves identifying affect expression by holistic judgements. The authors suggest that the two systems can be used with adolescents and adults. For a full discussion of these systems see Ekman and Friesen (1976, 1978), Scherer and Ekman (1982) and Izard (1982).

To summarize, it is not possible to conclude from the available evidence whether a category or dimensions approach is more appropriate. It is likely, as Ekman (1982) has suggested, that the approach used will depend on the investigator's hunch, theoretical bias, or preferred method of data analysis. Furthermore, as Ekman (1982) has optimistically suggested, the ability to measure the face directly

rather than relying on global judgements of facial expressions of emotion will lead to a breakthrough in the next generation of questions about emotion and the face.

## Clinical populations that show emotion recognition deficits

A number of clinical populations have been identified which differ from the normal population in their ability to recognize facial expressions of emotion. Schizophrenics have been reported as being less accurate in this ability than normals and other psychiatric patients (e.g. hospitalized depressives) (Dougherty, Bartlett & Izard 1974; Muzekari & Bates 1977; Walker et al., 1980; Walker et al. 1984). In an early study, Izard (1971) reported data that showed, emotionally disturbed children to be less accurate at recognizing facial expressions of emotion than a matched group of normal children. More recently, Zabel (1979) found a statistical difference between emotionally disturbed children and non-disturbed children in this ability.

Camras et al. (1983) found that abused children were less skilled in decoding facial expressions of emotion and were rated less socially competent than non-abused children. In another study, which compared accepted and rejected children's ability to perceive emotions from a video-taped interaction, it was found that accepted children scored significantly higher than rejected children (Vosk et al. 1983). Edwards et al.(1984) found a significant relationship between normal children's peer popularity and their emotion recognition ability. In addition children with high sociometric status were significantly better at recognizing facial expressions of emotion than those with low sociometric status. Reichenbach and Masters (1983) found that while not

specificially identified as a clinical group, children not living with both biological parents were less accurate in judging emotion in peers than children living with both biological parents. Furthermore, the misjudgements of the children not living with both biological parents were less often of happiness and more often of anger.

Very few studies to date have been concerned with the ability of mentally retarded persons to recognize facial expressions of emotion. Levy et al. (1960) found that mild and borderline mentally retarded adults could operate along a happiness-unhappiness continuum. Unfortunately, no other dimensions were investigated. More recently, Gray et al, (1983) found mentally retarded adults were less skilled than non-retarded subjects in recognizing six basic facial expressions of emotion (happiness, anger, sadness, fear, disgust, and surprise). Significant differences were also found between mildly and moderately retarded subjects. Gray et al. (1983) found considerable agreement on the occurrence of specific confusions but disagreement on their relative importance. Subjects were poor at recognizing anger and fear, confusing them with each other and with emotions such as disgust and surprise. Of interest is their finding that mentally retarded adults could operate the pleasant/unpleasant scale of Scholsberg's (1954) dimensional structure as accurately as non-retarded persons. However they were less able to operate the attention/rejection and intensity dimensions.

Gray et al.'s (1983) study is a hallmark in the area. It clearly demonstrated that methodologically sound studies could be conducted using research methods that have long been used with non-retarded subjects. Their study

highlighted the deficit mentally retarded adults have in recognizing facial expressions of emotion. However, they failed to recommend procedures which might rectify the discrepancies between mentally retarded and non-retarded persons. In addition, Gray et al. (1983) incorrectly labelled their subjects. Thirteen of their subjects were defined as mildly retarded (IQ 55-87, m = 68.77) and severely retarded (IQ 41-53, m = 47). According to the AAMD criteria (Grossman, 1983), they should have labelled their subjects as borderline mildly and moderately mentally retarded.

The studies reviewed above varied according to the type of assessment task used and the selection of responses subjects were required to make, thus making across-studies comparisons very difficult. These studies, with the exception of that of Walker et al. (1984), failed to incorporate a control task to determine whether the deficit lies at the level of decoding facial expressions of emotion or whether it is specific to the process of labelling emotional faces. Overall what emerges from these studies is that certain clinical groups have deficits in their ability to recognize facial expressions of emotion. Clearly there is a need to remediate such deficits in what has only recently been acknowledged as an important skill in effective social interaction.

## Training in the recognition of facial expressions of emotion

Several authors have recently highlighted the need to teach a number of clinical populations to accurately recognize facial expressions of emotion (Leathers & Emigh 1980; Muzekari & Bates 1977; Strongman, (in press); Vosk et al. 1983;

Walker et al. 1984; Zabel 1979). Muzekari and Bates (1977) found that normal subjects were significantly more accurate than schizophrenics in identifying emotions from both posed photographs of the face and from non-verbal videotaped scenes. These authors concluded that there was a need to teach chronic schizophrenics to identify and practise expressing discrete emotions. Similarly, Walker et al. (1984) recommended that schizophrenics be taught the skills necessary to enable them to recognize facial expressions of emotion. Walker et al (1984) suggested that training should consist of practice with photographs and films depicting facial expressions of emotion. In addition, they suggested subjects participate in modelling social interactions involving the various emotions.

In spite of the current neglect to teach the skills necessary for the recognition of facial expression of emotion in clinical populations, a number of studies have been conducted with non-retarded populations (Allport 1924; Ekman & Friesen 1975; Guilford 1929; Izard 1982; Jenness 1932; Mittenecker 1960).

In the earliest study Allport (1924) trained 12 young women. Subjects were pretested with facial expressions of emotion taken from the Rudolf series (drawings presumably from photographs but retouched). Subjects were then required to study a list of verbal descriptions of facial movements assumed to be related to a number of target emotions (see Allport, 1924, p.209). Using this brief 15 minute training procedure Allport reported a slight increase in the subjects' abilities to correctly label facial expressions of emotion (5.9% increase over initial ability). In addition, Allport (1924) found that

subjects who initially scored at a high level tended to decrease in percentage accuracy after training. In contrast subjects who initially scored at a low level tended to increase their accuracy scores substantially.

Using a more extensive training procedure, Guilford (1929) trained 15 students (seven male and eight females in four sessions over a period of 10 days) to correctly label facial expressions of emotion. Subjects were trained and tested as a group, using 105 Rudolf faces, which were projected onto a screen approximately 3 feet high. Training consisted of providing subjects with the "correct" labels of the expressions and highlighting the distinguishing features of each facial expression. Additionally subjects were required to study Allport's (1924) list of verbal descriptions of facial movements related to a number of target emotions (see Allport 1924, p.209), Overall the average improvement for both male and female subjects was only 5 % over the initial performance. This compares with an average gain of 5.9 % reported by Allport (1924) using a less extensive training procedure. Like Allport (1924), Guildford (1929) reported that as training progressed, subjects became more uniform in their ability to "correctly" label facial expressions of emotion. Guildford (1929) found a significant negative correlation between initial ability and improvement in ability. Allport (1924) and Guildford (1929) both concluded that the negative correlation was due to the fact that the superior subjects were normally less analytical in their approach. They both suggested that training interfered with what was an intuitive judgement for their subjects.

Jenness (1932) essentially replicated Allport's

(1924) study, adding a further training group and a control group. The first group consisted of 66 subjects who were trained for 15 minutes using Allport's (1924) training procedure. Training resulted in a gain in ability of 6.8%. A second group consisting of 29 subjects were then trained using the same procedure for an extended period (45 minutes in total). For this group, training resulted in a gain in ability of 8.1%. The third group consisting of 57 subjects and serving as the control group, received only pre and post-testing. On average no gain resulted on the second administration of the test. However Jenness (1932) found the control group showed the same kind of negative correlation between initial scores and gain in scores reported by Allport (1924) and Guilford (1929). He attributed the negative correlation to the unreliability of the test. When controlling for the unreliability of the test, by incorporating a control group, the negative correlation virtually disappeared. Thus, doubt was cast on the conclusions reached by Allport (1924) and Guilford (1929) with regard to the negative correlation they found.

These early studies (Allport 1924; Guilford 1929; Jenness 1932) collectively demonstrated that it was possible for subjects to improve their accuracy in judging facial expressions of emotion, albeit to only a minor degree. However, these studies suffered from a number of serious methodological problems, the most serious of which concerns the method of representing facial behaviour (i.e. Rudolf faces). Ekman (1982) in his review of the literature on the recognition of facial expressions of emotion did not consider any research in which drawings of facial expressions

of emotion were used. He stated:

> "Although drawings have the virtue of allowing control over demographic characteristics, lighting and various physiognomic features, they have the enormous failing that they may include as facial behaviour components that simply do not occur or cannot co-occur and possibly idosyncratic or stereotypic views of the artist. " (Ekman 1982, p.32).

Ekman (1982) added that until such time as a systematic means of scoring facial behaviour is widely accepted it is not possible to ascertain whether drawings represent fantasy or reality.

A further weakness relates to the emotion categories used by Allport (1924), Guilford (1929) and Jenness (1932). Specificially, they grouped amazement and fear together, noting differences only in the area of brows and forehead. Subsequent studies (Ekman 1982; Ekman et al. 1972; Izard 1971; Izard et al. 1980) have demonstrated that judges can make distinctions between these two categories and that further specific movements have been identified which relate different specific facial movements to these two emotions.

All three studies can be criticised for using weak experimental designs. Allport (1924) and Guilford (1929) did not include a control group to determine practice effects and other extraneous variables.

A final criticism concerns one aspect of the training procedure used in all three studies. Allport's (1924) synopsis of verbal labels of facial movements was said to be related to specific emotions. While Allport (1924) is to be commended for his attempt to relate specific muscular movements to specific emotions, he did not state how these movements were derived or what claim they have

to specific emotions.

More recently Mittenecker (1960) found that judgements of facial expressions of emotion could be improved by providing corrective feedback. Subjects who received feedback showed significant improvement in accuracy scores in contrast to a control group who did not. Conclusions are however, limited due to the lack of details in this study.

Ekman and Friesen (1975) have suggested that teaching the rules that translate a particular set of facial wrinkles into a judgement of whether a person is experiencing one of the six basic emotions, improves one's ability to recognize emotions in others. In addition, they suggest that learning the facial movements relevant to each emotion helps one interpret the feedback from the muscles of the face. To enhance learning, they suggested using a further technique called "flashing photographs". This procedure involves showing the subject a set of photographs one at a time with only a brief interval between them. After the set of photographs have been presented, subjects receive feedback on the accuracy of their judgements, with the correct labels being provided for mistakes.

In a series of studies, Izard et al. (1980) showed that the ability of untrained judges to correctly identify eight expressions of emotion (interest, joy, surprise, sadness, anger, disgust, contempt and fear) in infants could be improved with a brief training procedure. An interesting feature of these studies was the attempt to obtain spontaneous stimulus material. All previous studies (see Ekman 1982 for a comprehensive review) used posed stimuli. In an attempt to generate spontaneous expressions,

infants were exposed to a variety of antecedent events such as a sour taste or a surprise-box stimulus. The training procedures lasted from 20 to 30 minutes. Typically subjects were shown slides of the basic emotions, with the experimenter describing the characteristic patterns of expression in three facial regions (forehead/brow, eye/nose/cheeks, and mouth/chin). In addition, some subjects were required to study the Facial Expression Scoring Manual's(F.E.S.M.) list of facial movements associated with each emotion expression.

In sum, the Izard et al. (1980) series of studies demonstrated that a variety of untrained judges (e.g. college students, health service professionals) could be taught to improve their judgement of facial expressions of emotion. Judgements of slides and video-taped facial expressions of emotion by control groups showed that increases in accuracy resulted simply from repeating the procedure. However, the training group showed a significantly greater increase in accuracy than the controls.

Using a more involved procedure Izard and Dougherty (1982) trained subjects in the identification of discrete facial affect signals as part of the procedure for learning their System for Identifying Affect Expressions by Holistic Judgements (AFFEX). This system trains judges to observe the whole face, "integrating information from the different regions in a judgement process that labels the observed emotions directly" (Izard et al. 1980 p.114). Prior to being trained with AFFEX, judges must learn the Maximally Discriminative Facial Movement Coding System (MAX). This system was designed as an objective means of identifying discrete changes in facial appearance necessary for identifying the fundamental emotions (joy, surprise, sadness,

anger, disgust, contempt, fear, shame/shyness, and guilt). This focus on discrete changes in facial appearance is in contrast to the AFFEX which is concerned with global judgements of emotions. Thus before the judges were trained on the AFFEX they had learnt MAX and therefore had a full knowledge of the degree of objectivity required for coding facial behaviours and identifying affects. Judges having reached reliability on MAX (at least 80% agreement with the master code for the training material on four consecutive training segments) learnt AFFEX using the AFFEX manual and the AFFEX videotape. The AFFEX video contained photographs artist's drawings, and video segments of children's spontaneous facial behaviours illustrating eight emotion expressions. In addition, the tape contained expressions of physical distress or pain and several combinations of affect blends. The average training time to reach criteria using MAX was approximately 11 hours. Additional training time required to learn AFFEX to at least an 80% agreement with a master code, was 5 hours for four judges.

While general conclusions are limited to the methodological weaknesses in the early studies, collectively they showed that it is possible to teach normal subjects to improve their ability to recognize facial expressions of emotion. This suggestion is supported by the recent work of Izard et al. (1980). The extent to which other populations (e.g., schizophrenic and mentally retarded persons) can be taught to improve their judgement of facial expressions of emotions remains to be investigated.

## The Studies

Four studies were conducted for this thesis. Study 1

was designed to assess the abilities of a large sample of mentally retarded children and adults and non-retarded children in recognizing six basic facial expressions of emotion. In Study 2, mildly and moderately mentally retarded children and adults were compared in their ability to recognize facial expressions of emotion with their non-retarded mental age and sex controls. Study 3 consisted of the construction and validation of a series of role plays, portraying the six basic facial expressions of emotion. The video-taped role plays were used as generalization probes in the training study. The final study was conducted to determine if young mentally retarded adults could be taught to improve in their ability to correctly label facial expressions of emotion. Throughout all four studies the six basic facial expressions of emotions used were : Happiness, sadness, fear, disgust, surprise and anger.

# CHAPTER 2 : A PREVALENCE SURVEY

## The Recognition of Facial Expressions of Emotion

### Introduction

Gray et al. (1983) found that the ability to recognize six basic expressions of emotion was correlated with intelligence. With the exception of their study, little information concerning the ability of mentally retarded subjects to recognize discrete facial expressions of emotion has appeared in the published literature. This study was conducted to investigate and document this predominantly neglected area. A prevalence survey was undertaken to examine the abilities of mentally retarded children and adults to recognize facial expressions of emotion. A sample of non-retarded children was also examined in an attempt to assess the level at which they recognize facial expressions of emotion and to determine if as a group they differ from retarded subjects.

### Method

#### Subjects

Subjects were 501 children and adults from Christchurch, New Zealand. The sample consisted of 179 mentally retarded children (age range 5 to 19 years; mean age 13 years; 78% male and 22% female). The adult sample consisted of 194 mentally retarded adults (age range 19 to 67 years; mean age 33 years; 61% male and 39% female). In addition, 128 non-retarded school children from a state primary and an intermediate school were tested (age range 5

to 13 years; mean age 9.5 years; 48% male and 52% female).

The mentally retarded subjects were drawn from the following groups: school children living in the community (N = 100; age range 5 - 18 years; mean age 13 years; 61% male and 39% female); institutionalized school children (N = 79; age range 9 - 16 years; mean age 13 years; 100% male); adults attending community training centres (N = 116; age range 18 -66 years; mean age 33 years; 56% male and 44% female); institutionalized adults (N = 76; age range 20 - 67 years; mean age 34 years; 70% male and 30% female).

All subjects present at the time of testing were surveyed. Seven subjects refused to participate and three subjects could not be adequately tested because of behaviour problems. Due to regional differences in the location of some institutionalized school children, a sample of females was not available in the Christchurch region.

## Materials

Materials consisted of six sets of photographs depicting each of the six basic emotions (happiness, sadness, anger, fear, surprise and disgust). The 36 photographs were enlargements (24 cm x 16 cm) taken from a set of photographs developed and normed by Ekman and Friesen (1975) (see Appendix I). All photographs were black and white and were glued onto hardboard for protection.

## Experimenter

All subjects were individually tested by one experimenter, a 24-year-old male graduate student in psychology.

## Settings

The settings varied across the six groups examined. However, the rooms were typically used by the school/workshop to work with individuals on a one-to-one basis and all were detached from the rest of the classroom or workshop. All rooms contained a desk and two chairs. No other persons were present during testing.

## Dependent Variables

Each subject's responses were recorded on the data sheet illustrated in Appendix II. The subject's response was scored as either correct or incorrect. Each set of photographs was labelled with a letter (A,B,C,D,E,F) and each emotion within a set was randomly assigned a numeral between one and six.

A correct response was scored as a tick in the appropriate emotion column corresponding to the letter and number of the photograph. An incorrect response was written in to the column corresponding to the target emotion and number of the photograph. With this recording system, it was possible to determine which emotions were confused with the target emotion. Additionally it was possible to check the accuracy of the experimenter's recordings. Inter-rater reliability was calculated on 23% of all responses scored. An independent rater checked the data sheets on an event-by-event basis (Kazdin, 1982) to determine whether the subject's choice of photographs (indicated by a numeral and letter) corresponded to the checkmark in the appropriate emotion column. This was accomplished by checking the experimenter's recording

against a list of the correct emotions corresponding to the particular numeral and letter. Inter-rater reliability was computed by dividing the number of agreements on the recording of each behaviour on an event-by-event basis, by the sum of the agreements and disagreements, and the quotient multiplied by 100. An agreement was defined as both raters' responses concurring on an event by event basis. The mean inter-rater agreement was 99.4% (range 94-100).

For the purpose of the present study an emotion recognition task was implemented as opposed to an emotion labelling task. The former task requires a subject to select from a set of photographs, a photograph which depicts a target emotion. For example the subject is asked "can you show me a happy person?" The emotion labelling task however requires a subject to state which emotion is being portrayed. For example, the subject may be required to respond to the question "how is this person feeling?" The emotion recognition task was chosen as it is less ambiguous than other procedures such as labelling and emotion rating tasks (Harrigan, 1984). The emotion recognition task requires only a limited understanding of language and thus enables more severely retarded subjects to be tested. Harrigan (1984) found scores on the emotion recognition task to be significantly higher than scores on the emotion labelling task and suggested that recognition of an emotional state was less difficult than its verbal identification.

## Procedure

A procedure similar to that used by Gray et al. (1983) was adopted for this study. Each subject was individually tested in an experimental room. Subjects were asked the

meaning of the six basic emotions (happiness, surprise, anger, sadness, fear and disgust). For those subjects who were unable to demonstrate comprehension, the meaning of the words and illustrative examples were provided. If necessary the experimenter demonstrated physically the appropriate expression. Failure to demonstrate comprehension at this point resulted in the subjects viewing one set of photographs. If the subjects scored better than chance (one out of six) they were required to respond to the remaining three sets of photographs. This additional procedure was deemed necessary for assessing non-verbal subjects. Subjects who demonstrated an understanding of the meaning of the emotion labels were shown four of the randomly chosen sets of photographs regardless of the number of correct responses in the first set. Thus, subjects used for the study were tested on four (randomly chosen) of six sets of photographs.

During the test sessions, one set of the six photographs was arranged in a random order on a table in front of the subject. The following instructions were given: "Here are some pictures of peoples' faces I want you to look at. Some of them are sad, happy, surprised, frightened, angry or disgusted". Subjects were then read stories (as listed in Appendix III) in a random order. For example, a subject may be read: "If a person was given a present they had always wanted for their birthday, they would be glad. The person would be very happy. Can you show me a person who is happy?" The subject's response was recorded and the procedure was repeated for the remaining five stories, and remaining three sets of photographs. If the subject did not respond by pointing to a photograph, the question was repeated: -

"Can you show me a person who is happy?"

The experimenter responded to the subject's choice of photograph with one of several standard encouraging statements, for example "Good" or "Okay". However, if the subject did not respond after 30 seconds the next story was read. Throughout the above procedure, the experimenter did not look at the photographs or subject until the subject had selected a photograph.

## Results

The results for each of the three groups of subjects (mentally retarded children, adults and non-retarded children) are presented in Table 1.

Insert Table 1

Overall, mentally retarded children correctly identified an average of 9.9 facial expressions of emotion out of a total possible score of 24. Mentally retarded adults correctly identified an average of 6.8 facial expressions of emotion. In contrast non-retarded school children identified an average of 21.4 facial expressions of emotion out of a total possible score of 24. A clear trend emerged between retarded and non-retarded subjects with only 1% of non-retarded school children scoring less than 50%. In sharp contrast 64% of retarded children scored less than 50% correct on the emotion recognition task. Similarly approximately 80% of the retarded adults scored less than 50% correct.

Approximately half of the retarded subjects (70 children and 130 adults) failed the oral examination. Table 2 shows only those subjects who passed the oral examination, that is, subjects who demonstrated an understanding of the

Table 1

Percentage of Subjects Correctly Recognizing Facial Expressions of Emotion

| Subjects | N | Percentage correct categories 0-6 | 7-12 | 13-18 | 19-24 | Mean Score (Total Possible = 24) |
|---|---|---|---|---|---|---|
| Retarded school children | | | | | | |
| All deficits | 179 | 32 | 32 | 25 | 11 | 9.9 |
| Borderline | 19 | 0 | 10 | 53 | 37 | 16.5 |
| Mild | 62 | 19 | 35 | 31 | 15 | 12.0 |
| Moderate | 78 | 37 | 40 | 18 | 5 | 8.4 |
| Severe | 20 | 80 | 15 | 5 | 0 | 2.8 |
| Profound | 0 | 0 | 0 | 0 | 0 | 0 |
| Retarded adults | | | | | | |
| All deficits | 194 | 53 | 28 | 14 | 5 | 6.8 |
| Borderline | 6 | 0 | 17 | 50 | 33 | 16.5 |
| Mild | 34 | 15 | 32 | 35 | 18 | 12.9 |
| Moderate | 105 | 56 | 32 | 10 | 2 | 6.2 |
| Severe | 40 | 87 | 13 | 0 | 0 | 2.8 |
| Profound | 9 | 89 | 11 | 0 | 0 | 1.6 |
| Non-retarded children | | | | | | |
| Age in years | | | | | | |
| All ages | 128 | 0 | 1 | 13 | 86 | 21.4 |
| 5 - 6 | 21 | 0 | 5 | 43 | 52 | 19.0 |
| 8 - 9 | 28 | 0 | 0 | 14 | 86 | 20.7 |
| 10 - 11 | 48 | 0 | 0 | 6 | 94 | 22.3 |
| 12 - 13 | 31 | 0 | 0 | 3 | 97 | 22.9 |

Table 2

Percentage of Correctly Identified Emotions by Subjects who Passed the Oral Examination

| Subjects | N | Percentage correct categories 0-6 | 7-12 | 13-18 | 19-24 |
|---|---|---|---|---|---|
| Retarded school children | | | | | |
| Degree of retardation | | | | | |
| Borderline | 19 | 0.0 | 10.5 | 52.6 | 36.8 |
| Mild | 52 | 13.5 | 36.5 | 32.7 | 17.3 |
| Moderate | 37 | 13.5 | 54.1 | 24.3 | 8.1 |
| Severe | 1 | 100.0 | 0.0 | 0.0 | 0.0 |
| Retarded adults | | | | | |
| Degree of retardation | | | | | |
| Borderline | 6 | 0.0 | 16.7 | 50.0 | 33.3 |
| Mild | 30 | 6.7 | 33.3 | 40.0 | 20.0 |
| Moderate | 35 | 20.0 | 54.3 | 2.0 | 5.7 |
| Severe | 3 | 100.0 | 0.0 | 0.0 | 0.0 |
| Non-retarded school children | | | | | |
| Age | | | | | |
| 5 - 6 years | 21 | 0.0 | 5.1 | 43.1 | 52.4 |
| 8 - 9 years | 28 | 0.0 | 0.0 | 14.3 | 86.1 |
| 10 - 11 years | 48 | 0.0 | 0.0 | 6.3 | 94.1 |
| 12 - 13 years | 31 | 0.0 | 0.0 | 3.2 | 97.1 |
| Total | 128 | 0.0 | .8 | 13.3 | 86.0 |

meaning of the six basic emotions.

Insert Table 2

Again a clear trend emerged with less than 1% of non-retarded school children scoring less than 50% correct. However, 50% of retarded children fell into the category of obtaining a score of less than 50%, with 66% of retarded adults falling into the same category.

The mean total scores on the recognition task for non-retarded children increased progressively with age. Significant differences were found between 5 to 6 year-olds and 12 to 13-year-olds with the older children performing better than the younger children [$F(1,50) = 30.4$, $p < .001$]. This was true for all emotions, with significant differences being obtained at the .001 level for all emotions except anger, which was only significant at the .01 level for this group.

Similarly a significant difference was found between non-retarded 8 to 9-year-olds and 12 to 13-year-olds [$F(1,57) = 20.06$, $p < .001$], with the older children performing better than the younger children. With regard to individual emotions no significant differences were found for happy and angry, with only a small relationship existing for sad [$F(1,41) = 2.19$, $p < .25$] and disgust [$F(1,42) = 4.01$, $p < .10$ level]. However more significant differences were obtained for fear [$F(1,48) = 20.4$, $p < .001$] and surprise [$F(1,38) = 11.62$, $p < .01$ level].

There was no significant difference between non-retarded 5 to 6-year-olds and 8 to 9-year olds [$F(1,47) = 2.65$, $p < .25$]. There was no significant difference between the two age groups, for the following emotions: happiness, surprise, anger, and fear. There was however a significant difference for sadness [$F(1,45) = 6.76$, $p < .025$], and

disgust [$F(1,42) = 5.34$, $p < .05$].

With reference to individual emotions, happiness was identified correctly ahead of all other emotions. This was true for all groups.

As a group, mentally retarded children recognized sadness on 54% of occasions. Fear, anger and disgust were recognized on approximately 50% of occasions while surprise was the least well recognized emotion (44%).

Moderately retarded school children (living in the community) were particularly poor at recognizing anger (34%) and surprise (37%). This is in sharp contrast to the predominantly institutionalized sample of mildly retarded school children who recognized anger on more occasions than any other emotion, except happiness. Surprise was the least recognized emotion, followed by fear, for this group.

Borderline institutionalized school children recognized all emotions on more than 60% of occasions, surprise (61%) and disgust (62%) being the least recognized emotions.

---

Insert Table 3

---

As a group mentally retarded adults recognized disgust, anger and sadness on approximately 45% of occasions. Surprise and fear were the least recognized emotions with approximately 39% recognition. This relationship was evident for moderately retarded adults and to a lesser extent mildly retarded adults.

---

Insert Table 4

---

As a group non-retarded subjects recognized happiness, sadness, anger and disgust on approximately 90% or more occasions. Surprise and fear were the least recognized emotions with accurate recognition taking place on

Table 3

Number of Times Each Photograph was Selected in Response to Each Emotion for Mentally Retarded Children

| | Photograph | | | | | |
|---|---|---|---|---|---|---|
| Word | Happiness | Surprise | Anger | Sadness | Fear | Disgust |
| | | | Borderline retarded children | | | |
| Happiness | 72 | 1 | 0 | 0 | 0 | 1 |
| Surprise | 12 | 46 | 4 | 2 | 8 | 4 |
| Anger | 0 | 2 | 57 | 2 | 5 | 16 |
| Sadness | 0 | 3 | 5 | 62 | 3 | 3 |
| Fear | 0 | 12 | 4 | 6 | 52 | 2 |
| Disgust | 0 | 4 | 13 | 5 | 7 | 47 |
| | | | Mildly retarded children | | | |
| Happiness | 158 | 11 | 4 | 5 | 7 | 3 |
| Surprise | 44 | 80 | 10 | 14 | 33 | 7 |
| Anger | 3 | 11 | 103 | 14 | 20 | 37 |
| Sadness | 3 | 7 | 32 | 95 | 15 | 36 |
| Fear | 2 | 54 | 9 | 22 | 90 | 11 |
| Disgust | 6 | 16 | 32 | 17 | 19 | 98 |
| | | | Moderately retarded children | | | |
| Happiness | 113 | 13 | 7 | 6 | 5 | 6 |
| Surprise | 43 | 54 | 12 | 8 | 24 | 7 |
| Anger | 6 | 12 | 50 | 16 | 22 | 42 |
| Sadness | 5 | 5 | 30 | 71 | 14 | 23 |
| Fear | 2 | 33 | 17 | 17 | 61 | 18 |
| Disgust | 7 | 15 | 29 | 13 | 21 | 63 |
| | | | Total of mentally retarded children | | | |
| Happiness | 343 | 25 | 11 | 11 | 12 | 10 |
| Surprise | 99 | 180 | 26 | 24 | 65 | 18 |
| Anger | 9 | 25 | 204 | 32 | 47 | 95 |
| Sadness | 8 | 15 | 67 | 226 | 32 | 62 |
| Fear | 4 | 99 | 30 | 45 | 203 | 31 |
| Disgust | 13 | 35 | 74 | 35 | 47 | 208 |

Table 4

Number of Times Each Photograph was Selected in Response to Each Emotion for Mentally Retarded Adults

| | Photograph | | | | | |
|---|---|---|---|---|---|---|
| Word | Happiness | Surprise | Anger | Sadness | Fear | Disgust |
| | | | Mildly retarded adults | | | |
| Happiness | 109 | 5 | 1 | 0 | 4 | 1 |
| Surprise | 34 | 56 | 7 | 5 | 13 | 5 |
| Anger | 1 | 4 | 60 | 16 | 18 | 21 |
| Sadness | 3 | 3 | 18 | 66 | 12 | 18 |
| Fear | 0 | 30 | 15 | 10 | 56 | 9 |
| Disgust | 4 | 2 | 20 | 19 | 8 | 67 |
| | | | Moderately retarded adults | | | |
| Happiness | 106 | 13 | 1 | 5 | 13 | 2 |
| Surprise | 49 | 44 | 7 | 11 | 24 | 5 |
| Anger | 4 | 8 | 56 | 15 | 26 | 31 |
| Sadness | 2 | 11 | 20 | 55 | 15 | 37 |
| Fear | 6 | 25 | 19 | 21 | 46 | 23 |
| Disgust | 6 | 5 | 32 | 27 | 13 | 57 |
| | | | Total of mentally retarded adults | | | |
| Happiness | 215 | 18 | 1 | 5 | 17 | 3 |
| Surprise | 73 | 100 | 14 | 16 | 37 | 10 |
| Anger | 5 | 12 | 116 | 31 | 44 | 52 |
| Sadness | 5 | 14 | 38 | 121 | 27 | 55 |
| Fear | 6 | 55 | 34 | 31 | 102 | 32 |
| Disgust | 10 | 7 | 52 | 46 | 21 | 124 |

approximately 81% of occasions. For all age groups happiness and sadness were the most frequently recognized emotions, followed by anger and disgust, with fear and surprise being the least recognized emotions.

Insert Table 5

Table 6 shows the occurrence of particular confusions made by non-retarded children and retarded children and adults.

Insert Table 6

Table 5

Number of Times Each Photograph was Selected in Response to each Emotion for Non-retarded Children

| | Photograph | | | | | |
|---|---|---|---|---|---|---|
| Word | Happiness | Surprise | Anger | Sadness | Fear | Disgust |
| | | | 5 - 6 year olds | | | |
| Happiness | 83 | 0 | 0 | 0 | 0 | 1 |
| Surprise | 10 | 56 | 2 | 1 | 14 | 1 |
| Anger | 0 | 0 | 70 | 2 | 3 | 9 |
| Sadness | 0 | 2 | 6 | 71 | 2 | 3 |
| Fear | 0 | 23 | 0 | 5 | 55 | 1 |
| Disgust | 2 | 1 | 9 | 5 | 2 | 65 |
| | | | 8 - 9 year olds | | | |
| Happiness | 112 | 0 | 0 | 0 | 0 | 0 |
| Surprise | 0 | 87 | 1 | 0 | 24 | 0 |
| Anger | 0 | 0 | 101 | 3 | 3 | 5 |
| Sadness | 0 | 0 | 4 | 106 | 0 | 2 |
| Fear | 0 | 27 | 3 | 5 | 77 | 0 |
| Disgust | 2 | 4 | 4 | 0 | 4 | 98 |
| | | | 10 - 11 year olds | | | |
| Happiness | 192 | 0 | 0 | 0 | 0 | 0 |
| Surprise | 0 | 163 | 0 | 0 | 29 | 0 |
| Anger | 0 | 0 | 171 | 1 | 2 | 18 |
| Sadness | 0 | 1 | 3 | 187 | 1 | 0 |
| Fear | 0 | 27 | 1 | 2 | 162 | 0 |
| Disgust | 0 | 2 | 15 | 2 | 3 | 170 |
| | | | 12 - 13 year olds | | | |
| Happiness | 124 | 0 | 0 | 0 | 0 | 0 |
| Surprise | 0 | 117 | 0 | 0 | 7 | 0 |
| Anger | 0 | 0 | 116 | 0 | 0 | 8 |
| Sadness | 0 | 0 | 2 | 122 | 0 | 0 |
| Fear | 0 | 11 | 0 | 0 | 112 | 0 |
| Disgust | 0 | 0 | 0 | 0 | 0 | 119 |
| | | | All Ages | | | |
| Happiness | 511 | 0 | 0 | 0 | 0 | 0 |
| Surprise | 0 | 423 | 3 | 1 | 74 | 0 |
| Anger | 0 | 0 | 458 | 6 | 8 | 40 |
| Sadness | 0 | 0 | 17 | 486 | 3 | 5 |
| Fear | 0 | 88 | 4 | 17 | 406 | 1 |
| Disgust | 4 | 7 | 24 | 7 | 9 | 452 |

Table 6

Errors as Percentage of Possible Occasions for Error

| | Normal School Children | | | | | Mentally Retarded | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Adults | | | Children | | | |
| | 12-13 yrs | 10-11 yrs | 8-9 yrs | 5-6 yrs | Total yrs | Mild | Moderate | Total | Borderline | Mild | Moderate | Total |
| N | 31 | 48 | 28 | 21 | 128 | 30 | 36 | 66 | 19 | 52 | 37 | 108 |
| Anger/Fear | 0.0 | 1.0 | 2.8 | 3.6 | 1.9 | 15.0 | 18.6 | 16.8 | 6.6 | 10.6 | 14.9 | 10.7 |
| Surprise/Happy | 0.0 | 0.0 | 0.0 | 11.9 | 3.0 | 28.3 | 35.0 | 31.7 | 15.8 | 23.4 | 29.0 | 27.7 |
| Fear/Surprise | 8.9 | 14.0 | 24.1 | 27.4 | 18.6 | 25.0 | 17.9 | 21.5 | 15.8 | 28.7 | 22.3 | 22.2 |
| Surprise/Fear | 5.6 | 15.1 | 24.4 | 16.7 | 14.7 | 10.8 | 17.1 | 14.0 | 10.5 | 17.6 | 16.2 | 14.8 |
| Anger/Disgust | 6.5 | 9.4 | 4.5 | 10.7 | 4.8 | 17.5 | 22.1 | 19.8 | 21.0 | 19.6 | 28.4 | 23.0 |
| Disgust/Anger | 4.0 | 7.8 | 3.6 | 10.7 | 6.5 | 16.7 | 22.9 | 19.8 | 17.1 | 17.0 | 19.6 | 17.9 |
| Sadness/Disgust | 0.0 | 0.0 | 1.8 | 3.6 | 1.4 | 15.0 | 26.4 | 20.7 | 0.0 | 19.1 | 15.5 | 11.5 |
| Disgust/Sadness | 0.0 | 0.0 | 0.0 | 6.0 | 1.5 | 15.8 | 19.3 | 17.6 | 6.6 | 9.0 | 8.8 | 8.1 |
| Sadness/Anger | 1.6 | 1.6 | 3.6 | 7.1 | 3.5 | 15.0 | 14.3 | 14.7 | 6.6 | 17.0 | 20.3 | 14.6 |
| Anger/Sadness | 0.0 | 0.5 | 2.7 | 2.4 | 1.4 | 13.3 | 10.7 | 12.0 | 0.0 | 7.4 | 10.8 | 6.0 |
| Fear/Sadness | 0.8 | 1.0 | 4.5 | 6.0 | 3.0 | 8.3 | 15.0 | 11.7 | 7.9 | 11.7 | 11.5 | 10.4 |

## Discussion

The present survey of a large sample of mentally retarded children and adults shows a clear trend that mentally retarded children and adults are not as proficient at recognizing facial expressions of emotion as non-retarded school children. There was a clear trend in the retarded sample showing that the ability to recognize facial expressions was related to intelligence. These results support the findings of Gray et al. (1983) who reported that mildly retarded adults were significantly better than moderately retarded adults at recognizing photographs of the six basic emotions. Analysis of only those mentally retarded persons who could demonstrate an understanding of all six basic emotion words revealed trends similar to the larger sample. For non-retarded school children the ability to recognize facial expressions was related to age, confirming the recent findings of Harrigan (1984). The high recognition scores obtained with non-retarded school children supports the claim by Ekman et al. (1972) that the face provides accurate information about the six basic facial expressions of emotion.

For all groups happiness was by far the easiest emotion to recognize, followed by disgust, anger and sadness which were recognized approximately equally. Surprise and fear were the least recognized emotions. A similar trend was observed by Harrigan (1984) in a sample of non-retarded children. Similar patterns of accurate identification were obtained by Gray et al. (1983) with their sample of mentally retarded adults. However, there were a few notable exceptions. Gray et al.'s (1983) subjects were

more accurate at recognizing surprise which typically is cited as a difficult emotion to recognize (e.g. Harrigan 1984). In the present survey surprise was the least recognized emotion for mentally retarded children, closely followed by fear. And for adults, surprise and fear were the least recognized emotions. Another notable exception was Gray et. al's (1983) finding that anger was poorly identified. Such a finding is not typically reported in studies with non-retarded children or adults. However, in the present survey there was a marked contrast between a community sample of moderately retarded school children and a predominantly institutionalized sample of mildly retarded school children. The community sample of retarded children were poor at recognizing anger whereas the instutitionalized sample of retarded children correctly recognized anger on more occasions than any other emotion except happiness. Mentally retarded adults in the present survey recognized anger on approximately the same number of occasions as they did sadness and disgust. It seems clear that a person's social experience can greatly affect their ability to accurately recognize facial expressions of emotion.

Overall, Gray et al's (1983) sample of retarded persons was slightly more accurate at recognizing facial expressions of emotion than a similar group in the present study who passed the oral examination. There are several possible explanations for this finding. Firstly, Gray et al. (1983) used a relatively small sample of moderately and mildly retarded adults with only 13 subjects in each group. Furthermore their subjects were on average at the top of the mild and moderate range and indeed several

subjects were borderline rather than mildly retarded as claimed by the authors. The selection of a small sample of subjects at the top end of the mild and moderate range could well account for the discrepancies between Gray et al.'s (1983) and the present study. Another plausible explanation could lie in the fact that Gray et al. (1983) used a slightly stricter criterion for selecting subjects (i.e. testing for an understanding of the six basic emotion words). This possible explanation highlights the need for a quantitative means of selecting subjects who can demonstrate an understanding of the six basic emotions. Such a procedure would enable researchers to make more meaningful comparisons and avoid the subjective biases of investigators.

In the present study, approximately 50% of mentally retarded persons failed to demonstrate an understanding of the six basic emotion words. Of those who failed, a majority had minimal verbal skills. It is clear that the large number of subjects who scored poorly lacked verbal skills on a test that confers an advantage to verbally skilled subjects. The low scores could also be attributed in part to lack of familiarity with the present task. To overcome this possibility future studies could incorporate "warm up" trials in the procedure to familiarise the subjects with the task. Unfamiliarity with the experimenter may have also been a confounding factor.

In comparing the present results with those of Gray et al. (1983), overall, there is a similar pattern in the subjects' confusion of emotions. However there was some variation in the relative frequency of these confusions. Furthermore, mentally retarded adults in the present study

made more mistakes than Gray et al.'s (1983) subjects. The largest single confusion for non-retarded school children and mentally retarded children and adults in the present study was between surprise/fear and fear/surprise. The confusion occurred equally across the three groups but was more pronounced with mildly retarded children and adults. Gray et al. (1983) had found this confusion to be more pronounced with their mildly retarded subjects as well.

Non-retarded school children made five further minor confusions which were also common to the mentally retarded subjects. The first two minor confusions for non-retarded subjects were with anger/disgust and the reciprocal disgust/anger, which occurred on approximately 5% of possible occasions. All groups of mentally retarded adults and children confused the two emotions equally, on approximately 20% of occasions. Gray, et al. (1983) reported this to be a fairly common confusion for mildly and severely retarded adults, although they found this confusion more frequently among the moderately retarded. While not as pronounced, a similar trend was observed in the present study. A notable exception, however, was the finding that moderately retarded children confused disgust with anger an approximately 30% of occasions.

The remaining three minor confusions made by non-retarded school children were between sadness/anger, fear/sadness, and surprise/happiness. The same confusions were made by retarded children and adults although errors were more frequent for these groups. There was a tendency for all groups to select anger for sadness, although this trend was more evident for retarded subjects. The reciprocal

confusion was present but to a lesser extent. Gray et al. (1983) did not find the reciprocal confusion (anger/sadness) although this may have been because of their criterion of not reporting confusions which occurred on less than 10% of occasions. The tendency to select sadness for fear was also found in retarded subjects in this study, but not in that of Gray et al. (1983). Again a likely explanation seems to be the relatively low occurrence of this emotion in the Gray et al. study (1983).

The tendency of non-retarded children to select happiness for surprise was specific to the 5 to 6-year-old group. Notably, however, this was the largest (single) confusion made by mildly and moderately retarded children and adults. Interestingly, Gray et al. (1983) found that only one moderately retarded subject made this confusion, and that such a confusion is not reported in studies with non-retarded subjects. They argue that a likely explanation for this finding is "lexical rather than perceptual, in that among the severely handicapped as among children the word surprise means a happy surprise rather than an unpleasant shock" Gray et al. (1983). While this confusion was more pronounced with moderately retarded adults in the present study, it was a major source of confusion for mildly retarded adults as well. It does seem plausible that this confusion is due to both perceptual and lexical factors.

There was a tendency to select disgust for sadness in both groups of mentally retarded subjects although this confusion was less pronounced for children. The reciprocal confusion occurred to a lesser extent in both groups. No such finding was reported by Gray et al, (1983). Again this confusion was made by 5 to 6-year-old non-retarded

children only. The extent to which perceptual or lexical factors influenced correct judgement is unknown, although it is likely that both were involved.

Another source of confusion for mentally retarded subjects was their tendency to select fear for anger. Gray et al. (1983) found this pattern of confusion very nearly as common as the correct response overall. However, this confusion was not as pronounced in the present study.

In sum, a clear trend emerged showing mentally retarded children and adults are not as proficient at recognizing facial expressions of emotion as non-retarded school children. Furthermore. there was a trend amongst the mentally retarded sample showing the ability to recognize facial expressions of emotion was related to intelligence. These findings held regardless of whether or not subjects could demonstrate an understanding of all six emotions. The marked contrast between the retarded and non-retarded sample in recognizing facial expressions of emotion will be examined more closely when retarded subjects are compared to their mental age non-retarded controls in the following chapter.

# CHAPTER 3 : A MATCHED COMPARISON STUDY

## The Recognition of Facial Expressions of Emotion

The present comparison was conducted to determine if mentally retarded subjects differed significantly from their mental age peers (controlled for sex). In addition, mildly and moderately retarded groups were compared, to determine if the ability to recognize facial expressions of emotion is correlated with intelligence as reported by Gray et al. (1983). This study compared 40 mentally retarded children (20 mildly retarded and 20 moderately retarded) and 40 mentally retarded adults (20 mildly retarded and 20 moderately retarded) with 80 non-retarded subjects, matched on mental age and sex.

### Method

#### Subjects

The subjects were 160 children and adults. The average age, range and numbers of males and females for the respective groups are shown in Table 7. In addition, the I.Q. ranges and means for the mentally retarded groups are given.

---

Insert Table 7 here

---

All subjects were able to demonstrate an understanding of the six basic emotion words (happiness, sadness, surprise, anger, fear and disgust). The mentally retarded subjects were randomly selected from the "recognition survey" sample (see Chapter 2), all of whom had demonstrated an understanding of the six basic emotions. Similarly, non-retarded subjects were selected from the "recognition survey" sample, solely on the basis of matching with retarded subjects on mental age and sex. To complete the matched comparison, it was necessary to

Table 7

Demographic Characteristics of Subjects

| | IQ Range | Mean IQ | Age Range | Mean Age | No. Males | No. Females |
|---|---|---|---|---|---|---|
| Mild Adults | 54-67 | 60 | 19-57 | 31 | 11 | 9 |
| Non-retarded matches | - | - | 8-10 | 10 | 11 | 9 |
| Moderate adults | 41-52 | 47 | 20-63 | 31 | 12 | 8 |
| Non-retarded matches | - | - | 6-8 | 7 | 12 | 8 |
| Mild school children | 55-69 | 62 | 9-16 | 13 | 20 | 0 |
| Non-retarded matches | - | - | 4-8 | 6.5 | 20 | 0 |
| Moderate school children | 40-51 | 45 | 10-17 | 15 | 14 | 6 |
| Non-retarded matches | - | - | 4-7 | 5 | 14 | 6 |

select 42 additional non-retarded subjects from the initial school population used for the recognition survey. Subjects from the school were selected on the basis of mental age and sex. All subjects were able to demonstrate an understanding of the six basic emotions.

The experimenter, a graduate student in psychology, had previously tested 118 of the subjects during the recognition survey and their scores from that survey were used for the current comparison. An additional 42 non-retarded subjects were tested by the same experimenter to complete the necessary matches.

Setting

All subjects were tested in a room detached from the activities of the subjects' regular classroom or workshop. The rooms typically consisted of a desk and two chairs.

Materials

Materials consisted of six sets of photographs depicting each of the six basic emotions (happiness, sadness, anger, fear, surprise and disgust). The 36 photographs were developed and normed by Ekman and Friesen (1975) (shown in Appendix 1). All photographs were black and white and were glued on to hardboard for protection.

Dependent Variables

Data were collected during the hours the subjects attended school, i.e., approximately 9 a.m. to 3 p.m. Each subject's response was recorded as either correct or incorrect. Each set of photographs was labelled with a letter (A,B,C,D,E,F) and each emotion within a set was randomly assigned a number one to six. The labels occupied an inconspicuous area at the top left hand corner,

approximately 10mm by 16 mm. A correct response resulted in a tick in the appropriate emotion column on the data sheet (Appendix II) corresponding to the letter and number of the photograph. If the subject selected the incorrect emotion depicted in the photograph, the subject's choice was written in the column corresponding to the target emotion and number of the photograph. Thus it was possible to determine which emotions were confused with the target emotion and to check the accuracy of the experimenter's recordings. For reasons stated in Chapter 2 a recognition task was selected.

Accuracy was calculated on 20% of subjects' responses. An independent observer checked the data sheet on an: event-by-event basis to determine whether the subject's choice of picture (indicated by a number and a letter) corresponded to the tick in the appropriate emotion column. This was accomplished by checking the experimenter's response against a list of the emotions corresponding to the particular letter and number.

Inter-rater agreement was computed by dividing the number of agreements on the recording of each behaviour on an event - by - event basis, by the sum of the agreements and disagreements, and the quotient multiplied by 100. An agreement was defined as both raters' responses concuring on an event-by-event basis. Mean inter-rater agreement was 99.7% (range 96-100).

## Procedure

As 118 subjects (both retarded and non-retarded) had been tested during the recognition survey, they were not tested again and the result from the original survey was

used in the present comparison. However, 42 additional non-retarded subjects were tested to complete the matched comparison. Each subject was tested individually. All subjects were able to demonstrate an understanding of the six basic emotions.

Prior to testing each subject, four of the six sets of photographs were randomly chosen for that session. Only four sets were used in an attempt to avoid testing fatigue. Each set of six photographs was arranged randomly on a table in front of the subject. The following instructions were then given: "Here are some pictures of people's faces I want you to look at. Some of them are happy, angry, surprised, sad, frightened or disgusted". Each subject was then read the stories (see Appendix III) in a random order and asked to show the experimenter the picture of a person who exhibited the target emotion. The subject's response was recorded and the procedure was repeated for the remaining five stories. This was repeated for the other three sets of pictures. No subject needed further probing to point to a photograph when requested. The experimenter responded to the subject's choice of photograph with one of several standard statements of descriptive praise. Throughout the testing the experimenter did not look at the photographs or the subject until a photograph had been selected, thus avoiding unwittingly influencing the subject's response. The entire procedure took approximately 15 minutes.

## Results

A two-way analysis of variance showed that all four groups of retarded subjects were less accurate in their recognition of facial expressions of emotion than their matched comparisons (mildly retarded adults [$F(1,38) = 43.25$, $p < .001$]; moderately retarded adults $F(1,38) = 94.65$, $p < .001$; mildly retarded children [$F(1,38) = 16.34$, $p < .001$]; moderately retarded children [$F(1,38) = 16.76$, $p < .001$)].

A one-way analysis of variance showed that all groups of retarded subjects were poorer at recognizing all individual emotions when compared to their non-retarded matches. The moderately retarded adults were significantly poorer at recognizing all emotions when compared to their non-retarded controls: Surprise [$F(1,38) = 27.94$, $p < .001$]; Anger [$F(1,38) = 94.69$, $p < .001$]; Sadness [$F(1,38) = 39.09$, $p < .001$]; Fear[$F(1,38) = 27.92$. $p < .001$]; Disgust [$F(1,38) = 54.76$; $p < .001$] and Happiness[$F(1,38) = 11.88$, $p < .001$]. Mildly retarded adults were significantly less accurate in recognizing all emotions compared to their non-retarded matched controls: Happiness [$F(1,38) = 7.31$, $p < .025$]; Surprise [$F(1,38) = 17.29$, $p < .001$]; Anger [$F(1,38) = 23.81$, $p < .001$]; Sadness F[ $(1,38) = 26.81$, $p < .001$]; Fear [$F(1,38) = 6.28$, $p < .025$] and Disgust [$F(1,38) = 6.80$, $p < .025$].

Mildly retarded school children were significantly less accurate in recognizing all emotions when compared to their non-retarded matched controls: Happiness $F(1,38) = 11.33$, $p < .01$]; Surprise [$F(1,38) = 10.54$, $p < .01$]; Anger [$F(1,38) = 6.22$, $p < .025$]; Sadness [$F(1,38) = 9.35$, $p < .01$];

Disgust [$F(1,38) = 10.29$, $p < .01$]. A small significant difference between the two groups was found for fear [$F(1,38) = 1.45$, $p < .25$]. Moderately retarded school children were significantly less accurate in recognizing all emotions than their non-retarded controls. However the significant levels for recognizing fear and disgust were not as great as for the other emotions: Happiness [$F(1,38) = 9.56$, $p < .01$]; Surprise [$F(1,38) = 6.22$, $p < .001$]; Anger [$F(1,38) = 19.7$, $p < .001$]; Sadness [$F(1,38) = 23.44$, $p < .001$]; Fear [$F(1,38) = 2.90$, $p < .10$]; Disgust [$F(1,38) = 2.78$, $p < .25$].

A two-way analysis of variance showed that the ability to recognize facial expressions of emotions was related to intelligence, when moderately retarded and mildly retarded adults were compared [$F(1,38) = 8.404$, $p < .01$]. Difference on five of the six emotions was statistically significant. However sadness, fear and disgust were only significant at the .05 level: Sadness [$F(1,38) = 8.28$, $p < .01$]; Fear [$F(1,38) = 4.276$, $p < .05$]; Disgust [ $(1,38) = 4.41$, $p < .05$]. No significant differences in the ability to recognize surprise was found between the two groups $F(1,38) = 1.00$. Slight but significant differences were found for happiness [$F(1,38) = 2.398$, $p < .25$] and anger [$F(1,38) = 3.23$, $p < .10$].

A two-way analysis of variance showed that the ability to recognize facial expressions of emotions was not related to intelligence when mildly and moderately retarded school children were compared [$F(1,38) = .5579$]. Furthermore, no significant differences for individual emotions were obtained for these groups.

As a group, retarded subjects recognized happiness on 80% of occasions. Disgust, sadness and anger were recognized on 42% of occasions; surprise was the least recognized emotion (38% of occasions). Similarly, individual retarded children and adults (both mildly and moderately retarded) showed the same trend as the group as a whole. However there were two notable exceptions. The moderately retarded children were poorer at recognizing anger (43% recognition) and mildly retarded children were more accurate at recognizing anger (54% recognition) relative to the other five emotions.

As a group the non-retarded matched controls recognized happiness on 100% of occasions. On approximately 84% of occasions anger, sadness and disgust were recognized. Surprise was recognized on 71% of occasions, with fear being the least well recognized (63% recognition). Similarly each of the four non-retarded groups recognized the six emotions in the same order of accuarcy. However, with regard to the least recognized emotion (fear), the trend for the youngest age group was reversed with surprise being the least recognized emotion. The individual confusions made by all subjects can be seen in Tables 8, 9 and 10. Table 11 shows the occurrence of particular confusions made by non-retarded children and by retarded children and adults.

---

Insert Tables 8, 9, 10 and 11 here

---

Table 8

Number of Times Each Photograph was Selected in Response to Each Emotion Word for Retarded Children and Matched Controls

| | Photograph | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Word | Happiness | Surprise | Anger | Sadness | Fear | Disgust | Happiness | Surprise | Anger | Sadness | Fear | Disgust |
| | Mildly retarded children | | | | | | Non-retarded matched comparisons | | | | | |
| Happiness | 63 | 6 | 2 | 1 | 4 | 4 | 79 | 0 | 0 | 0 | 0 | 1 |
| Surprise | 15 | 31 | 4 | 5 | 19 | 6 | 8 | 52 | 1 | 1 | 17 | 1 |
| Anger | 2 | 7 | 43 | 10 | 9 | 9 | 0 | 0 | 61 | 2 | 6 | 11 |
| Sadness | 1 | 1 | 11 | 44 | 5 | 18 | 0 | 0 | 7 | 67 | 2 | 4 |
| Fear | 2 | 22 | 4 | 8 | 34 | 10 | 0 | 27 | 1 | 8 | 42 | 2 |
| Disgust | 2 | 6 | 14 | 10 | 11 | 37 | 2 | 1 | 13 | 1 | 2 | 61 |
| | Moderately retarded children | | | | | | Non-retarded matched comparisons | | | | | |
| Happiness | 64 | 5 | 4 | 3 | 3 | 1 | 80 | 0 | 0 | 0 | 0 | 0 |
| Surprise | 21 | 32 | 8 | 7 | 8 | 4 | 5 | 49 | 5 | 1 | 15 | 5 |
| Anger | 1 | 6 | 34 | 10 | 9 | 20 | 0 | 1 | 64 | 1 | 4 | 10 |
| Sadness | 0 | 3 | 14 | 40 | 9 | 14 | 0 | 2 | 3 | 71 | 0 | 4 |
| Fear | 2 | 16 | 7 | 8 | 37 | 10 | 0 | 18 | 1 | 8 | 51 | 2 |
| Disgust | 5 | 5 | 15 | 2 | 9 | 39 | 2 | 3 | 11 | 4 | 8 | 52 |

Table 9

Number of Times Each Photograph was Selected in Response to Each Emotion Word for Retarded Adults Matched Controls

| | Photograph | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Word | Happiness | Surprise | Anger | Sadness | Fear | Disgust | Happiness | Surprise | Anger | Sadness | Fear | Disgust |
| | Mildly retarded adults | | | | | | Non-retarded matched comparisons | | | | | |
| Happiness | 70 | 4 | 1 | 0 | 4 | 1 | 80 | 0 | 0 | 0 | 0 | 0 |
| Surprise | 23 | 33 | 6 | 3 | 12 | 3 | 1 | 63 | 1 | 0 | 15 | 0 |
| Anger | 0 | 3 | 41 | 12 | 12 | 12 | 0 | 0 | 71 | 1 | 3 | 5 |
| Sadness | 1 | 2 | 10 | 49 | 5 | 13 | 0 | 1 | 2 | 76 | 0 | 1 |
| Fear | 0 | 21 | 9 | 6 | 38 | 6 | 0 | 16 | 3 | 6 | 55 | 0 |
| Disgust | 3 | 2 | 11 | 12 | 5 | 47 | 1 | 2 | 4 | 0 | 4 | 69 |
| | Moderately retarded adults | | | | | | Non-retarded matched comparisons | | | | | |
| Happiness | 59 | 9 | 1 | 3 | 7 | 1 | 80 | 0 | 0 | 0 | 0 | 0 |
| Surprise | 25 | 25 | 4 | 7 | 15 | 4 | 0 | 62 | 2 | 0 | 15 | 1 |
| Anger | 4 | 5 | 28 | 7 | 17 | 19 | 0 | 1 | 75 | 1 | 0 | 3 |
| Sadness | 1 | 11 | 10 | 27 | 10 | 21 | 0 | 0 | 4 | 69 | 1 | 6 |
| Fear | 3 | 16 | 10 | 11 | 25 | 15 | 0 | 20 | 1 | 5 | 53 | 1 |
| Disgust | 6 | 3 | 20 | 14 | 7 | 30 | 0 | 1 | 4 | 2 | 5 | 68 |

Table 10

Total Number of Times Each Photograph was Selected in Response to Each Emotion Word for Retarded Subjects and Matched Comparison

| | Photograph | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Word | Happiness | Surprise | Anger | Sadness | Fear | Disgust | Happiness | Surprise | Anger | Sadness | Fear | Disgust |
| | Mentally retarded subjects | | | | | | Non-retarded subjects | | | | | |
| Happiness | 256 | 24 | 8 | 7 | 18 | 7 | 319 | 0 | 0 | 0 | 0 | 1 |
| Surprise | 84 | 121 | 22 | 22 | 54 | 17 | 14 | 226 | 9 | 2 | 47 | 7 |
| Anger | 7 | 21 | 146 | 39 | 47 | 60 | 0 | 2 | 271 | 5 | 13 | 29 |
| Sadness | 3 | 17 | 45 | 160 | 29 | 66 | 0 | 3 | 16 | 283 | 3 | 15 |
| Fear | 7 | 75 | 30 | 33 | 134 | 41 | 0 | 81 | 6 | 27 | 201 | 5 |
| Disgust | 16 | 16 | 60 | 43 | 32 | 153 | 5 | 7 | 32 | 7 | 19 | 250 |

Table 11

Errors as Percentage of Possible Occasions for Error

| | Non-retarded subjects | | | | | Retarded subjects | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Matched for moderate school children | Matched for mild school children | Matched for mild adults | Matched for moderate adults | TOTALS | Moderate school children | Mild school children | Moderate adults | Mild adults | Children TOTALS | Adult TOTALS |
| Anger/Fear | 5.0 | 7.5 | 3.8 | 0 | 4.0 | 11.3 | 11.3 | 21.3 | 15.0 | 11.3 | 18.2 |
| Surprise/Happiness | 6.3 | 10.0 | 1.3 | 0 | 4.4 | 26.3 | 18.8 | 31.3 | 28.8 | 22.6 | 30.0 |
| Fear/Surprise | 27.5 | 34.8 | 20.0 | 25.0 | 25.6 | 20.0 | 27.5 | 20.0 | 26.3 | 23.8 | 23.2 |
| Surprise/Fear | 18.8 | 21.3 | 18.8 | 18.8 | 19.4 | 10.0 | 23.8 | 18.8 | 15.0 | 16.9 | 16.9 |
| Anger/Disgust | 12.5 | 13.75 | 6.3 | 3.8 | 9.1 | 25.0 | 11.3 | 23.8 | 15.0 | 18.2 | 19.4 |
| Disgust/Anger | 13.75 | 16.3 | 5.0 | 5.0 | 10.0 | 18.8 | 17.5 | 25.0 | 13.8 | 18.2 | 19.4 |
| Sadness/Disgust | 5.0 | 5.0 | 1.3 | 7.5 | 4.7 | 17.5 | 22.5 | 26.3 | 16.3 | 20.0 | 21.3 |
| Disgust/Sadness | 5.0 | 1.3 | 0 | 2.5 | 2.2 | 8.8 | 12.5 | 17.5 | 15.0 | 10.7 | 16.3 |
| Sadness/Anger | 3.8 | 8.8 | 2.5 | 5.0 | 5.0 | 17.5 | 13.8 | 12.5 | 12.5 | 15.7 | 12.5 |
| Anger/Sadness | 1.25 | 2.5 | 1.3 | 1.3 | 1.6 | 12.5 | 12.5 | 8.8 | 15.0 | 12.5 | 11.9 |
| Fear/Sadness | 10.0 | 10.0 | 7.5 | 6.3 | 8.5 | 10.0 | 10.0 | 13.8 | 7.5 | 10.0 | 10.7 |

## Discussion

Both mildly and moderately retarded children and adults were significantly less accurate in their recognition of facial expressions of emotion than their matched non-retarded controls. This partially supports the findings of Gray et al. (1983) that the ability to recognize facial expressions of emotion is related to intelligence. However, no significant difference in this ability was found between mildly and moderately retarded children. The mildly retarded group represents a predominantly institutionalized population, whereas the moderately retarded group was a community sample of school children. Arguably the different environments (community versus institution) may have resulted in the lack of difference between the two groups in their ability to recognize facial expressions of emotion. While such comments are at best speculative they highlight the need to study various populations, for example community and institutionalized mentally retarded persons.

With regard to the group comparisons, all analyses conducted between mentally retarded subjects and non-retarded controls showed significant differences. However the significance levels for individual emotions varied. While differences between mentally retarded adults and their non-retarded controls were all highly significant, several emotions were only minimally significant when retarded children were compared to their mental-age normal controls. A small but significant difference in recognizing fear was found between non-retarded matches and both mildly and moderately retarded children. Fear is a difficult emotion to recognize even amongst non-retarded children and adults (Ekman & Friesen, 1975; Harrigan 1984), and it is probable

that children either retarded or non-retarded may only infrequently see fear expressed compared to other emotions. Therefore, they may have only limited opportunities to learn an emotion which even non-retarded adults have difficulty in recognizing. Another small but significant difference was found between moderately retarded children and their non-retarded controls in their ability to recognize disgust. As this emotion is reported to be correctly identified at high levels on an emotion recognition task (Harrigan 1984), it is likely that the difference found in the present study may be due to the moderately retarded subjects' limited verbal abilities. Again, it is possible that the low frequency of observing this emotion in everyday life may have contributed to the results obtained.

In sum, mentally retarded subjects recognized facial expressions of emotion at an overall level of 51% accuracy compared to 81% in non-retarded controls. A percentile ranking of emotions (see Tables 8, 9, 10) shows in general terms a similar overall pattern for retarded and non-retarded subjects. Happiness and sadness were more frequently recognized than disgust and anger. Fear and surprise were the least frequently recognized emotions. These results are comparable to those obtained by Harrigan's (1984) study with non-retarded children.

A pattern of confusions similar to that described in the recognition survey (Chapter 2) emerged in the present comparison. First, for non-retarded children the greatest confusion was in selecting surprise for fear. The reciprocal confusion, selecting fear for surprise, was the second most commonly made by non-retarded school children. The remaining

confusions made by non-retarded school children occurred on 10% or less of occasions.

A similar pattern of confusions made by retarded children and adults in the recognition survey was obtained in the present comparisons. The most common single confusion made by mentally retarded adults was in selecting happiness for surprise. This was closely followed by a fear/surprise confusion. There was a cluster of confusions which occurred on approximately 19% of occasions. These included the tendency to select anger for fear, surprise for fear, anger for disgust. The remaining five confusions made by mentally retarded adults occurred on approximately 13% of occasions.

The confusions made by retarded children in the present study parallelled those obtained with mentally retarded adults. However there were two exceptions. First, the adults more frequently selected surprise for happiness, with a slight tendency for this confusion to be more pronounced in the moderately retarded. Such a trend is in accord with Gray et al.'s (1983) finding, suggesting a lexical explanation. It is likely that for both low functioning mentally retarded adults and children, surprise typically means a happy surprise rather than an unpleasant shock.

Overall, when comparing the confusions made by Gray et al.'s (1983) mentally retarded adults and the children in the present study there emerges some agreement on the occurrence of particular confusions. However, two confusions in the present study (anger/sadness and fear/sadness), which occurred on approximately 11% of occasions, were not reported by Gray et al. (1983). As Gray et al. (1983) only

reported confusions on 10% or more of possible occasions it seems probable that these confusions may have just failed to meet their criterion. The same reason may explain why the tendency to select disgust for sadness which occurred on 15% of occasions in the present study was not reported by Gray et al. (1983). Another discrepancy in the present study as compared to Gray et al.'s (1983) results is the relatively low occurrence of the anger/fear confusion. A clear explanation for this discrepancy is not apparent, although it could be because of the different stimulus stories being used.

With the exception of the confusions mentioned above there is an overall agreement with Gray et al. (1983) on the relative importance of the confusions. A similar pattern of confusions for mildly and moderately retarded subjects emerges although there is variation in their relative importance. One such variation for mildly retarded children and adults was the selection of surprise for happiness. While this was the most common confusion made by severely retarded subjects in the Gray et. al. (1983) study, no such confusion was made by mildly retarded subjects in their study. In the present study, tendency to select surprise for happiness was a major source of confusion for all subjects, whereas Gray et al.'s (1983) results showed this confusion to occur only among severely retarded adults. Gray et al. (1983) attribute their finding to a lexical rather than a perceptual explanation. They suggest that for severely retarded and non-retarded children the word "surprise" means a happy surprise (e.g. surprise party) as opposed to an unpleasant shock. Although subjects were pretested, Gray et al. (1983) claim that some subjects may have demon-

strated enough comprehension by using examples like "surprise party" to pass the pretest. However in the present study this confusion was not limited to severely retarded subjects. Therefore it seems a more parsimonious view would suggest both factors were involved.

# CHAPTER 4 : CONSTRUCTION AND VALIDATION OF THE GENERALIZATION PROBE

## Introduction

In discussing posed facial expressions of emotion as stimulus material, Ekman (1982) stated that a number of issues with regard to the generality of the expressions need to be addressed. Ekman (1982) raised four questions about the generality of findings from studies using posed facial expressions of emotion. These are:

> "Are the findings relevant to spontaneous facial behaviour (generality across settings and eliciting circumstances)?; Do the results depend on the few specially gifted actors (generality across persons)?; Are the findings attributable to those rare moments when someone emits a decipherable pose (generality across time)?; Is exact judgement the privilege of only those who are specially trained as observers (generality across observers)?" (Ekman 1982, p.15).

There is some controversy over the issue of spontaneous versus posed facial expressions of emotion. The advantages of posed facial expressions of emotion were discussed in the general introduction. Briefly it is relatively easy (in contrast to spontaneous emotions) to obtain clear records of posed facial expressions of emotion which can be readily identified with regard to the poser's intent. In the present study, posed facial expressions of emotion were used.

Ekman (1982) has suggested that more than one eliciting circumstance should be used when emotions are posed, e.g., posing under different instructions, acting, and role playing. Using a variety of procedures avoids the likeli-

hood that one eliciting circumstance will result in facial expressions which are peculiar to one procedure rather than the target emotion.

The aim of the present study was to develop and norm a series of 24 role plays depicting the six basic emotions (happiness, sadness, anger, fear, disgust and surprise). During the construction of the role plays particular attention was focussed on addressing the four types of questions about the generality of the findings mentioned above. The next chapter describes the use of role plays as generalization probes, where young mentally retarded persons were taught to recognize facial expressions of emotion.

## Method

### Subjects for role plays

Six females and four males (age range 23 to 35; mean age 28 years) produced 120 role plays depicting the six basic emotions. All role plays were video-taped. In an attempt to make the subjects feel more at ease, friends of the experimenter were chosen as subjects. The sessions were conducted in the subjects' homes. However because of distractions in three of the subjects' home environments they chose to be video-taped at the experimenter's home. A common friend to all 10 subjects was used to engage the subjects in the role plays when necessary. Subjects varied in their occupations, with five having had limited experience in role playing. No subject had any acting experience.

All subjects were video-taped individually in 30-minute sessions, during which time each subject was required to produce each emotion twice. To produce the first emotion,

subjects were given the choice of remembering an experience in which they felt the target emotion or were given a standard emotion invoking situation. Subjects typically chose their own experiences. After completing the role play subjects filled out a questionnaire which was used as the basis for selecting role plays for the judgement study. Subjects were asked if they expressed a single emotion, and to rate a number of questions on a 1-to-7 point scale. These questions related to how well the expressions were portrayed, the technique they used to generate the expression, the intensity of the facial expression, the language used (see Appendix V).

Having completed the questionnaire, subjects were required to produce the emotion again. However, this time they were shown six pictures of the target emotion prior to the role play. These were the same photographs used in the recognition survey and matched comparisons. The distinguishing features of each target emotion were pointed out to the subject. Having completed the role play, subjects filled out the questionnaire once again. This procedure was repeated for the remaining five emotions.

Role plays used for the judgement study were selected from the questionnaires if they met a number of criteria. First, only role plays in which the subject thought a single emotion was portrayed were accepted. Second, only role plays which rated five or more on the questions relating to "how well" and "how intense" the emotions were felt, were included. On the basis of the above criteria 65 out of 120 role plays were selected for the judgement study.

Subjects for the judgement study

Five males and 14 females (age range 18 to 44 years; mean age 26 years) were chosen on a random basis to participate in the judgement study. None of them had participated in the video-taped role plays.

Settings

All sessions were conducted in either a small lecture theatre or an office. In both settings, the subjects sat directly in front of the video monitor at a distance of 2.1 metres.

Design

A randomised latin square design 3x6 was used in which 18 subjects were randomly assigned to one of three groups. Each group of six subjects saw the video in three different conditions which were counterbalanced across groups. A period of approximately 1 week occurred between the viewing of the three conditions. Condition A consisted of viewing the video without sound (face only condition), i.e. picture only, condition B was sound only (language only condition), and condition C was both sound and picture presented concurrently (facial and contextual combination).

Procedure

All subjects were tested individually. However on several occasions in the "sound only" condition two subjects were tested simultaneously. The purpose of the study was briefly explained to subjects, namely, that it was necessary for the role plays to be evaluated, to determine the "best"

illustrations of the target emotions. The role plays were then to be used as part of the experimental procedure in training mentally handicapped persons to recognize facial expressions of emotion. Subjects were requested to pay particular attention to blends of emotion, that is, two or more emotions occurring simultaneously. Subjects were then shown the role plays which were of approximately 15 to 30 seconds' duration.

After each role play the video was stopped and the subject was required to fill out a questionnaire (see Appendix V). In a forced choice situation, subjects were required to choose which emotion was portrayed in the role play from a list of the six basic emotions. In addition there was a category in which the subjects could record their own choice of a label, if necessary. Subjects also indicated if a single emotion was expressed. Similarly subjects rated a number of questions on a 7-point scale. These questions were related to the strength of the emotion; how well the emotion was expressed; how typical of everyday life situations the role play was; and to what extent factors other than facial expressions and language influenced the subject's judgement. Depending on which of the three conditions the subject was viewing, sessions took approximately 30 to 60 minutes.

## Results

Even though subjects were counterbalanced across conditions in an attempt to avoid confounding the results many subjects reported remembering the role plays from the previous sessions a week before. Therefore carry-over

effects between the three conditions seemed very likely. An analysis of sequence effects was considered of little value as the reliability of the role plays had not been established To minimize this possibility only the results from the subjects' first encounter with the video were used; that is, the ratings from the group which first viewed the video without sound; the ratings from the group which first heard the sound only and the ratings from the first group to view the video with sound and picture together. In this manner 19 observations were used across the three conditions. With this procedure 35 observations were made redundant because of the possibility of carry-over effects.

Agreement as to the occurrence of a single facial expression being portrayed across the three conditions ranged from 84% to 100%. However, two role plays were slightly below this range with 79% agreement amongst judges. When judges heard only the sound, agreement as to the occurrence of a single emotion being portrayed was 16% for six of the role plays. However agreement in the two other conditions for the same six emotions ranged from 85% to 100%.

Data from the completed questionnaires, in which subjects agreed a single expression of emotion had been portrayed are shown in Tables 12, 13 and 14.

The scores for each subject on the four different videos of each emotion were added together to produce the subject's total score for that emotion. This was done for each subject across all six emotions. The means of the scores for all ratings are presented in Tables 12, 13 and 14.

Responses to questionnaire on facial and contextual combination

As shown in Table 12, disgust was judged to be portrayed the best, followed by sadness, anger and surprise with happiness being the poorest. All emotions except happiness, were rated high on the intensity scale. Factors other than facial expressions and language may have influenced judges' decisions. However, the influence of these factors appears to be small. Overall the role plays were rated as being typical of everyday life situations, with fear being rated as the least typical.

Insert Table 12 here

Responses to questionnaire on the face only condition

Subjects' responses to the questionnaire after viewing the "face only condition" are shown in Table 13. Sadness was judged to be portrayed the best, being slightly ahead of happiness, surprise and disgust. Anger and fear were rated lower than the other four emotions. Subjects rated disgust and surprise highest on the intensity scale, closely followed by sadness, happiness, anger and fear.

Insert Table 13 here

Response to questionnaire on the language only condition

Subjects' ratings to questions on how influential language was in deciding which emotion was portrayed and ratings of the intensity of language are shown in Table 14. Overall the importance of language in making a decision about which emotion was portrayed was rated approximately at the middle point of the total means score. Language was rated more important in

Table 12

Mean Responses to Questions on Face and Contextual Information

| | Questions | | | |
|---|---|---|---|---|
| Emotion | How Well | How Intense | Other factors | Everday life |
| Sadness | 21.7 | 19.6 | 9.5 | 19.4 |
| Happiness | 17.0 | 15.2 | 6.6 | 21.8 |
| Surprise | 20.3 | 18.9 | 6.8 | 19.3 |
| Anger | 20.4 | 20.6 | 7.7 | 20.8 |
| Fear | 21.4 | 20.7 | 10.9 | 14.7 |
| Disgust | 23.5 | 19.4 | 8.2 | 20.6 |

Table 13

Mean Responses to Questions on Face Only

| | Questions | |
|---|---|---|
| Emotion | How well | How intense |
| Sadness | 23.5 | 22.6 |
| Happiness | 22.6 | 22.7 |
| Surprise | 22.7 | 25.0 |
| Anger | 20.9 | 22.9 |
| Fear | 21.0 | 23.5 |
| Disgust | 22.8 | 24.7 |

decisions concerning the emotions disgust and fear. The intensity of the language used was rated approximately at the middle point of the total mean score. The language used in the role plays portraying fear was rated as more intense to sadness, surprise and anger. The language used in the role plays portraying happiness and disgust was rated the least intense relative to the above emotions.

Insert Table 14 here

## Discussion

A series of role plays depicting the six basic emotions were developed and rated as typical of everyday life situations. High levels of agreement on the intended posed emotion were obtained for the four sets of the six basic emotions. The role plays were constructed in such a manner as to ensure generality across persons, across observers, and across time.

These results provide further support to the notion that posed facial expressions of emotion can be accurately recognized by observers (Ekman 1982; Izard 1971). Furthermore, subjects were reasonably good at portraying the various emotions on request. Subjects used a variety of techniques to generate the facial expressions including deliberately expressing a face to fit a memory to the expression and imagining a past emotional experience to recreate the feelings from which the expression flowed. Frequently, however, subjects used a combination of these two techniques. No claims can be made as to whether subjects actually experienced "emotion" although some subjects did claim they felt the target emotion they were portraying. This claim highlighted the need to question subjects as to whether the emotion was posed or whether the

Table 14

Mean Response to Questions on Contextual Information

| | Questions | |
|---|---|---|
| Emotion | How influential | How intense |
| Sadness | 14.9 | 14.0 |
| Happiness | 15.6 | 12.4 |
| Surprise | 14.5 | 13.6 |
| Anger | 15.4 | 13.9 |
| Fear | 17.0 | 15.1 |
| Disgust | 17.4 | 12.3 |

person subjectively "felt" the target emotion.

Surprisingly, happiness, was rated as the poorest emotion portrayed and as the least intense emotion. The low rating of happiness on the intensity scale may in part explain why it was rated as the poorest portrayed emotion. It seems the subjects tended to equate intensity with how well the emotion was portrayed.

In the sound only condition, language was rated by subjects as being only moderately influencial in making judgements of the target emotion. Similarly language was rated as only moderately intense. It seems clear the low scores on the above ratings are due to the six role plays (one of each emotion) not having any language. While speculative, it seems likely that for the remaining 18 emotions both sources of information (sound and picture) were of approximately equal clarity and importance in the recognition process.

Future studies should use a much longer period between the viewing of each of the three conditions, if ratings are made by the same subjects for each condition. Clearly, in the present study one week was not long enough as subjects typically reported remembering role plays from the previous week. Subjects stated that this influenced their judgements.

Finally, researchers should address the question of the frequency with which the various emotions are observed in everyday life. In the present study judges were asked to rate how "typical" of everyday life situations the role plays were. A more specific question could gauge the frequency with which the emotions would be observed within a certain period of time, e.g., a week.

# CHAPTER 5 : TRAINING STUDY

## Introduction

The recognition survey established that a large number of mentally retarded children and adults were poor at recognizing facial expressions of emotion (see Chapter 2). Similarly when retarded subjects were compared with their non-retarded mental age and sex controls, highly significant differences between the two groups were found (see Chapter 3). The present study was conducted to determine whether retarded subjects could be taught to correctly label facial expressions of emotion portrayed in photographs. Additionally, this study addressed the issue of generalization from photographs of facial expressions of emotion to role plays of everyday life situations.

Several investigators have claimed that non-retarded subjects can be taught to improve their accuracy in recognizing facial expressions of emotion (Allport 1924; Ekman & Friesen 1975; Guilford 1929; Izard and Dougherty 1980; Jenness 1932; Mittencker 1960). However, there are a number of methodological problems with several of these studies (e.g. Allport, 1924; Guilford 1929; & Jenness 1932), for example, using drawings of facial expressions of emotion as the method of presenting facial behaviour, and grouping together amazement and fear (which have subsequently been shown to be distinct categories). Two studies (Allport 1924; & Guilford 1929) did not include a control group. Nor did Ekman and Friesen (1975) evaluate their claim that subjects could be taught to improve their ability to recognize facial expressions of emotion. No study has focussed on training and evaluating a procedure for teaching subjects who

had been identified as deficient in this skill. Rather in several studies (e.g. Izard & Dougherty, 1982; Izard et al. 1980) training was aimed at improving non-retarded subjects' abilities to recognize facial expressions of emotion, to enable them to make more reliable decisions in judgement studies using emotions expressed by infants.

Incorporating several of the techniques used in the training studies (detailed in Chapter 1) a procedure designed to meet the needs of mentally retarded subjects was developed. Three basic techniques were used. First, subjects were taught the basic rules of facial movements relevant to each emotion (see Ekman & Friesen 1975). Second, over-correction was used as the instructional technique, and third, the "flashing photograph" technique suggested by Ekman and Friesen (1975) was incorporated to increase the speed at which subjects made their judgements.

## Method

### Subjects

One severely mentally retarded and six moderately retarded adults according to the AAMD criteria (Grossman 1983), (IQ range 31-48, mean = 41) who attended a vocational resource centre for the mentally retarded, participated as subjects in the present study. All subjects had attended the vocational resource centre since leaving school. Two subjects had Down's syndrome but the etiology of the other five subjects was not known.

The WISC-R was used to obtain IQ scores for all subjects (except one whose IQ had previously been tested using the Stanford Binet). Subjects' ages and scores

were as follows: Jane A, age 29 years, IQ = 42; Joy, age 20 years, IQ = 42; Paul A, age 28 years, IQ = 43; Neil, age 24 years, Verbal IQ = 44; Mandy, age 24 years, IQ = 41; Jane B, age 29 years, IQ = 41; Paul B, age 23 years, IQ = 31 (Stanford Binet).

Subjects were selected for the study if they met the following criteria:

(a) they could explain the meaning of the six basic emotions;

(b) they were young adults (i.e. 20 to 29 years of age);

(c) were willing to participate after the procedure was explained to them;

(d) had obtained a score of 50% or less in the "recognition test survey" which was administered two months earlier and;

(e) when retested using a labelling procedure, had still obtained a score of 50% or less on the same dependent variables (i.e., Ekman & Friesen 1975, photographs).

Two subjects were on medication when the study was conducted. Mandy was on "Melleril" (10 mg 2x) and Jane B was on "Diazepam" (2 mgs notce daily). All medication was kept constant throughout the study.

Experimenter

Baseline and training sessions were conducted by a single experimenter. The experimenter's previous contact with each subject was limited to approximately 10 to 15 minutes which was spent conducting the "recognition survey" two months earlier.

## Setting

Training took place in a room (2.2m x 3.2m) within the workshop which was usually used for interacting with trainees on a one-to-one basis. The room consisted of a table and two chairs facing a blank wall with a cupboard in one corner. The subjects in the present study were trained to recognize facial expressions of emotion during both morning and afternoon sessions, five times a week.

## Materials

Materials consisted of eight sets of black and white photographs (see Appendix I) depicting the six basic emotions (happiness, sadness, anger, fear, surprise, and disgust). These 48 photographs were enlarged copies (24cm x 16cm) of photographs developed by Ekman and Friesen (1975). The photographs were fixed to a hardboard backing for protection and durability.

Six of the eight sets (36 photographs) were used as "test photographs" and were the same as were used in the survey and matched comparison studies (see Chapters 2 & 3) The other two sets (12 photographs) which had previously been unused in either the survey or matched comparison studies, were used as "demonstration photographs".

A video of previously developed brief role plays (15 to 30 seconds) of everyday life situations (see Chapter 4) was used for generalization probes. The six basic emotions were each portrayed in the video four times, making a total of 24 role plays.

## Design

A multiple baseline across subjects design, incorporating a generalization probe, was used (Baer, Wolf, & Risley, 1968). Probes were used to examine whether subjects were able to generalize the labelling of facial expressions of emotion from photographs to emotions expressed in role plays of everyday life situations.

## Experimental Procedure

Each subject was individually escorted by the experimenter from his/her work place and brought to a separate room where he/she was seated at a table next to the experimenter. Prior to the commencement of each session, one of the two groups of 18 photographs (consisting of three sets of each of the six basic emotions) was randomly selected and used with all subjects during that morning or afternoon session.

Baseline Baseline data were obtained by presenting one group of photographs (three sets of six photographs), one at a time, to each subject and asking: "How is this person feeling?" The experimenter responded to the subjects' labels (both correct and incorrect) with one of several standard encouraging statements, for example "Good" or "Okay". If the subject did not respond after 20 seconds the question was repeated. If an incomplete answer was given (e.g. "grinning") the subject was questioned again. If the subject failed to respond after repeated questioning (twice more) the next photograph was shown.

To avoid the possible detrimental effects of prolonged

testing during baseline, a procedure suggested by Cuvo (1979) was implemented. That is, all subjects were tested at least once at approximately the same time at the beginning of the study, thus providing an initial baseline measure. For the first subject, five baseline sessions were conducted. After each successive introduction of training to each "new" subject all subjects not receiving training had baseline data collected before and after the training of the "new" subject. Before any subject received training, a minimum of two consecutive baseline sessions prior to intervention were scheduled.

Training The training procedure was divided into four phases, with movement through the four phases being dependent on meeting a given criterion (see below). After each training session, the subject was tested on one of the two groups of "test photographs" (18 photographs in each group), chosen randomly prior to the training session. The first training session was 15 to 20 minutes in duration, and thereafter each training session lasted from 5 to 10 minutes.

Phase One During this phase, one set of demonstration photographs was spread in front of the subject who was required to point to the following characteristics on two of the photographs: wrinkles, lips, eyes, nose and eyebrows. Correct identification of all of the above features resulted in the subject moving on to phase two.

If a subject failed to distinguish one of the above facial features, the experimenter named the feature and simultaneously pointed to and/or traced the feature on the photograph. The subject was then required to repeat the

experimenter's action and label the facial feature on the photographed face five times. Verbal reinforcement was provided for each correct response (e.g. "Good, that is an eyebrow"). The subject moved on to the next phase when he/she correctly identified the facial feature on five consecutive trials.

Phase two Five of the demonstration photographs, each portraying one of the five different emotions, were spread out in front of the subject. Additionally, two of the demonstration photographs of the target emotion to be taught were spread out in front of the subject (total of seven photographs). For the purpose of illustrating the procedure, disgust will be used as the target emotion. The subject was given the following instructions: "These two people feel disgusted or awful [synonyms that were accepted as alternatives are shown in Appendix IV]. When somebody feels disgusted or awful they have (a) a wrinkled nose, (b) cheeks that are raised, (c) a brow that is lowered, and (d), an upper lip which is raised." The experimenter then pointed or traced the above facial features with his finger. The subject was then required to point or trace with his/her finger the above facial features. Each incorrect identification resulted in the subject being shown and asked to point or trace the mis-identified facial feature on either of the two target photographs, five times. Descriptive praise (e.g., "Yes! that is a wrinkled nose") was provided for all correct responses. When the subject could identify a minimum of 50% of the relevant facial features for each emotion, without error, he/she moved on to phase three.

Phase Three One of the two sets of "demonstration photographs" was spread out in front of the subject (six emotions). The experimenter pointed to each photograph and asked: "How is this person feeling?" Correct identification resulted in descriptive praise. Incorrect identification resulted in overcorrection; that is, the subject was told the correct response and asked to repeat the correct label for the emotion five times, while pointing and looking at the target photograph. Once the subject correctly labelled the two sets of "demonstration photographs", on each occasion, he/she then moved on to the final phase.

Phase Four In this phase, the subject was shown the 12 "demonstration photographs" one at a time over a decreasing time period. That is, the period between the showing of each group of photographs decreased on each correct trial, starting at 5 seconds on the first trial and decreasing by 1 second on each successive trial (to a minimum of 1 second). Training was terminated when subjects could correctly identify the 12 "demonstration photographs", five times without error. Periodically during this phase (i.e. a approximately every sixth training session) a generalization probe test (see below) was conducted.

An additional procedure was used after five trials if subjects consistently correctly labelled the "demonstration photographs" in phase four but failed to generalize to the "test photographs". This involved the subject viewing the "demonstration photographs" after phase four, with alternatively the top or bottom of the face covered. Correct labels were provided for the misidentified expressions. This additional procedure was deemed necessary as subjects who

consistently misidentified expressions typically only focussed either on the top or bottom of the face. Thus attention was focussed on the part of the face which appeared to be neglected by the subject.

After each session, scores for that training/testing session were plotted on a graph so that subjects could monitor their progress. All subjects were informed at the outset of the study that they would receive an enlarged photograph of themselves when the study was completed.

Generalisation Tests Twenty-four video-taped role plays of the six basic emotions, judged to be typical of everyday life situations (see Chapter 4) were used as the generalization probes. Baseline recordings of the generalization probes were conducted on a minimum of two occasions with each subject. All subjects not receiving training had baseline recordings (of the generalization probes) collected on the same day. Each video-taped role play was shown to each subject once. The video tape was then stopped and the subject asked: "How is this person feeling?" The experimenter responded to the subject's labels (both correct and incorrect) with one of several standard encouraging statements, for example "Good" or "Okay". If the subject did not respond after 20 seconds the question was repeated. If an incomplete answer was given (e.g., "teeth") the subject was questioned again. If the subject failed to respond after repeated questioning twice more) then an encouraging statement (e.g. "That is okay") was given and the next role play was shown.

Recording Each subject's responses were recorded on

data sheets (illustrated in Appendix 2) as either correct or incorrect. Each set of photographs was labelled with a letter from A to F, and each emotion within a set was randomly assigned a numeral between 1 and 6.

A correct response was scored as a tick in the appropriate emotion column corresponding to the letter and number of the photograph. An incorrect response was written in the column corresponding to the target emotion and number of the photograph. With this recording system, it was possible to determine which emotions the subjects were confused about and to check the accuracy of the experimenter's recordings.

A similar method of recording the subjects' responses was used when they were tested on the generalization probes. The only exception was that the video-taped role plays were numbered 1-24 rather than with the letter and number used with the photographs.

## Reliability

Inter-rater reliability was calculated on 20% of the recordings. An independent rater checked data sheets on an event-by-event basis (Kazdin, 1982) to determine whether the label used by the subject corresponded to the appropriate emotion column. This was accomplished by checking the experimenter's recordings against the list of acceptable synonyms (see Appendix IV) and an independent record of the numbers and letters and corresponding correct emotions.

Inter-rater reliability was computed by dividing the number of agreements on the correct recording of each response, on an event-by-event basis by the sum of the agreements and disagreements, and the quotient multiplied

by 100. An agreement was defined as both raters concurring on an event-by-event basis.

The mean inter-rater reliabilities were as follows: photographs 99.4% (range = 96 - 100) and video-taped role plays 100%.

## Results

The results show that one severely and six moderately retarded subjects can be taught to improve their ability to correctly label six facial expressions of emotion (happiness, sadness, disgust, anger, surprise and fear) portrayed in photographs. Furthermore accuracy at labelling facial expressions portrayed in role plays (rated typical of everyday life situations) increased over training sessions. This was true for all subjects (see Figure 1). The mean percentages correct for each subject during the two phases are presented in Table 15.

Insert Table 15

Mean percentage scores for correctly identifying the emotions portrayed in the photographs for each subject ranged from 11% to 45% during baseline and from 55% to 84% during training. The mean percent correct on the last five consecutive training sessions are shown in Table 16.

Insert Table 16

Follow-up data after approximately 8 to 9 months showed the correct labelling of facial expressions of emotion was maintained at relatively high levels for all subjects.

Generalization Probes Mean percentage scores on the probes followed a similar trend to the scores obtained on the photographs, with all subjects showing an increase during training between 23% and 64% (see Table 17).

Insert Table 17

All subjects gradually improved in their ability correctly label the video probes. Typically, subjects were more accurate at labelling facial expressions of emotion portrayed in the generalization probes than in the photographs. Two notable exceptions were Jane B. and Mandy.

## Figure Caption

Figure 1 Number of correctly labelled facial expressions of emotion across subjects and experimental conditions.

Figure 1

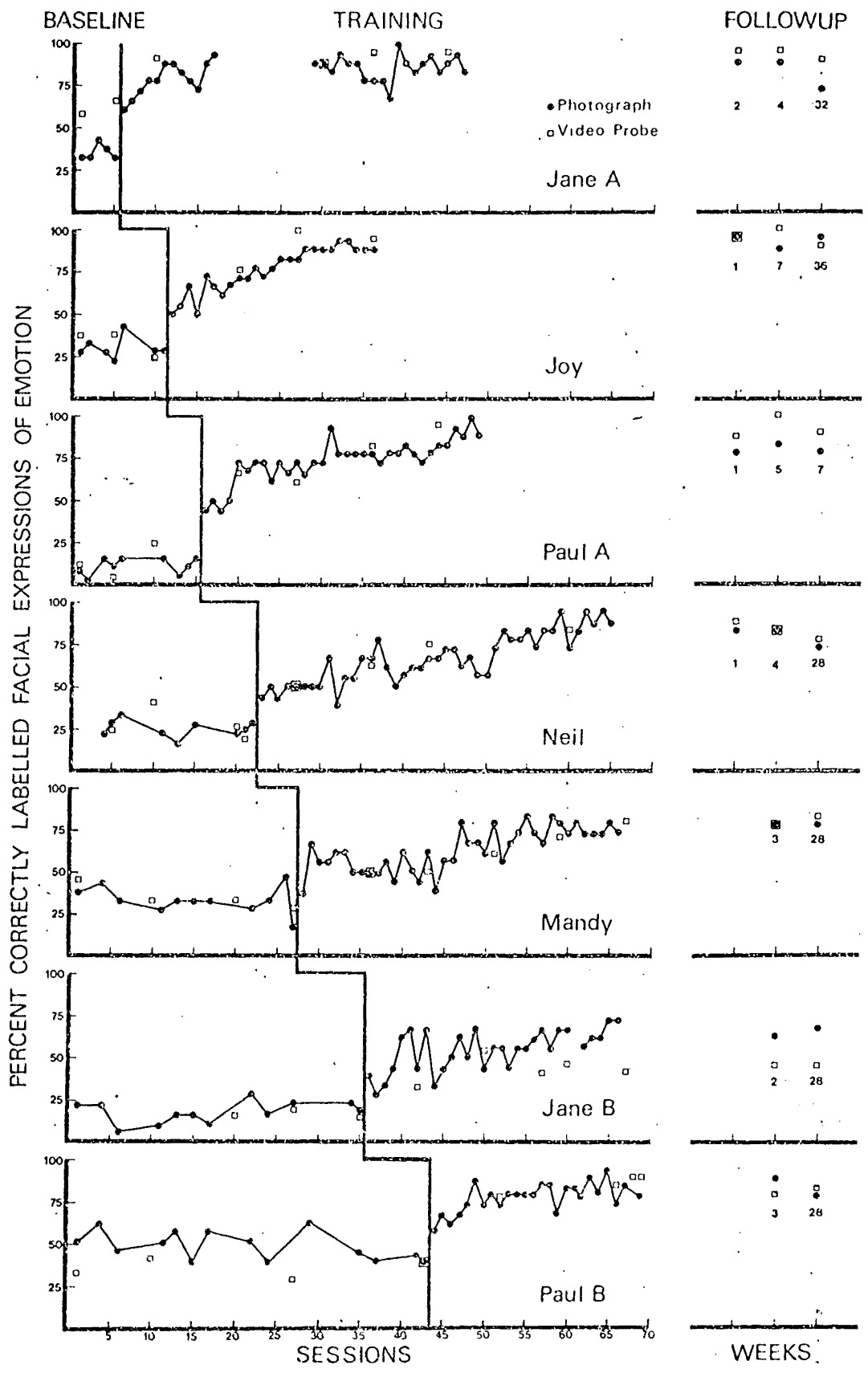

BASELINE
TRAINING
FOLLOWUP
Photograph
Video Probe
Jane A
Joy
Paul A
Neil
Mandy
Jane B
Paul B
PERCENT CORRECTLY LABELLED FACIAL EXPRESSIONS OF EMOTION
SESSIONS
WEEKS

Table 15

Mean Percentage of Correctly labelled photographs

| | Baseline | Training | Percentage Increase |
|---|---|---|---|
| Jane A. | 36.6 | 83.3 | 46.7 |
| Joy | 30.0 | 76.6 | 46.6 |
| Paul A. | 11.1 | 77.7 | 66.6 |
| Neil | 23.8 | 67.2 | 43.4 |
| Mandy | 33.3 | 63.3 | 30.0 |
| Jane B. | 17.7 | 55.0 | 37.3 |
| Paul B. | 47.7 | 77.2 | 30.2 |

Table 16

Percentage of Correct Response on the Last Five Consecutive Sessions

| | Photographs | Video probes |
|---|---|---|
| Jane A. | 89 | 96 |
| Joy | 91 | 96 |
| Paul A. | 91 | 96 |
| Neil | 90 | 96 |
| Mandy | 73 | 79 |
| Jane B. | 64 | 42 |
| Paul B. | 88 | 81 |

Table 17

Mean Percentage of Correctly Labelled Video Probes

| | Baseline | Training | Percentage increase |
|---|---|---|---|
| Jane A. | 62.5 | 92.9 | 30.4 |
| Joy | 33.3 | 90.4 | 57.1 |
| Paul A. | 13.7 | 78.3 | 64.6 |
| Neil | 28.3 | 73.3 | 45.0 |
| Mandy | 35.4 | 62.5 | 27.1 |
| Jane B. | 18.3 | 42.9 | 24.6 |
| Paul B. | 35.4 | 83.3 | 47.9 |

## Discussion

The results of the present study clearly demonstrated that moderately mentally retarded adults can be taught to recognize facial expressions of emotion portrayed in photographs. Furthermore, it was shown that the increased recognition generalized across photographs of different people and to role plays of situations rated typical of everyday life situations.

One subject (Jane B) scored notably lower than the other six subjects (64% correct on photographs and 42% correct on the video when averaged over the last five consecutive sessions). On Jane B's second training session, she stated that she had "had enough for today" and asked to leave. She was however, willing to continue training the next day. Due to her limited attention span on the present task, training sessions were of approximately half the duration of the sessions with other subjects. This may in part have contributed to her relatively low intervention score.

A notable feature which held for all subjects in the present study was the speed with which they learnt to correctly label the 12 "demonstration photographs". However, the ability to generalize from the "demonstration photographs" to the "test photographs" which consisted of faces of different people was not immediate. Training sessions frequently terminated quickly with subjects meeting the criterion for correctly labelling the "demonstration photographs" five times in succession. However the subjects were then often not able to correctly label the test photographs.

The discrepancy between the time it took subjects to correctly label "demonstration photographs" can, in part, be

accounted for by two factors. Firstly, because of the limited availability of photographs, only 12 (two of each emotion) were used as "demonstration photographs". Furthermore, only two people portrayed the six emotions in the "demonstration photographs" with three emotions being portrayed by the same person twice. It is likely that such a small number of people portraying the emotional expressions in the photographs may not have helped the subjects to generalize facial expressions of emotion to different persons.

Another possible explanation lies in the fact that subjects received no feedback as to the accuracy of their judgements with the "test photographs". Subjects consistently misidentified some emotional expressions, often because they paid attention to only one part of the face. In an attempt to overcome this bias the three subjects who had not reached criterion for terminating training were subjected to the additional procedure (outlined earlier) which required the subjects to pay attention to either the top or bottom half of the face in isolation. Subjects quickly mastered this skill, resulting in a small increase in the number of correctly identified "demonstration photographs".

Another aspect of the training procedure which needs to be addressed involves teaching the facial movements associated with each emotion. Typically the responses of the more verbal subjects to the task of identifying facial expressions was to correctly state the rules associated with a facial expression before labelling the photograph. For example, they said - "eyebrows up, mouth open - the person is surprised". Subjects with somewhat limited verbal skills tended not to state the facial movements

associated with each emotion.

The degree to which the teaching of the facial movements is a necessary component of training for those subjects with poor verbal skills needs to be examined. To clarify this issue future studies should examine the effectiveness of overcorrection when teaching persons with limited verbal skills.

A comparison of the results of the present study with other published literature is severely limited, due to there being no study on teaching mentally retarded persons to correctly label facial expressions of emotion available in the published literature. Furthermore as discussed on pp. 25 to 29, many of the early studies with non-retarded subjects were methodologically weak (e.g. Allport 1924; Guildord 1929; Jenness 1932). In more recent studies training has not focussed on teaching persons deficient in this skill, rather subjects were trained using anatomically based systems (e.g. AFFEX & MAX) to improve their global judgements. This enabled accurate judgements to be made for research into the facial behaviour of infants (Izard & Dougherty 1980). Similarly, Izard et al. (1980) attempted to improve subjects' global judgements of facial expressions of emotion using a 30-minute training procedure. This resulted in non-retarded subjects improving their accuracy of recognition of facial expressions of emotion by 17%.

It is worth noting that Ekman and Friesen (1975) suggested that through learning the muscular movements which relate to each emotion results in improved accuracy of recognizing emotions. However they did not empirically test their claim.

In summary, the study showed that mentally retarded adults can be taught to correctly label facial expressions of emotion portrayed in photographs. Generalization occurred across persons, and to role plays of situations rated typical of everyday life. Several refinements of the training procedure were suggested including using a larger number of "demonstration photographs" with many different persons portraying the different emotions. Research is needed to examine the effects of providing feedback to subjects as to the accuracy of their judgements during testing.

# CHAPTER 6 : GENERAL DISCUSSION

Mentally retarded persons were found deficient in their ability to recognize facial expressions of emotion. This important social skill was identified as one facet of interpersonal behaviour necessary for effective social interaction. The prevalence survey showed that retarded children and adults were not as proficient as non-retarded children at recognizing the six basic facial expressions of emotion (i.e., happiness, sadness, surprise, disgust, fear and anger). Average scores (out of a total of 24) for correctly recognizing the six basic emotions for the respective groups were as follows: retarded children 9.9; retarded adults 6.8; and non-retarded children 21.4. Large numbers of retarded persons were deficient in this skill. Overall, 64% of retarded children scored less than 50% correct on the emotion recognition task. Similarly approximately 80% of retarded adults scored less than 50% correct. In sharp contrast only 1% of non-retarded children scored less than 50% correct. There was a clear trend showing that the ability to recognize facial expressions of emotion was related to intelligence. Furthermore, for non-retarded subjects the ability to recognize facial expressions of emotion was related to age, with older children performing better than the younger children. Overall, for both retarded and non-retarded subjects, happiness was identified correctly ahead of all other emotions. Sadness, disgust and anger were clustered together, with surprise and fear being the least recognized emotions.

The matched comparison study revealed significant differences between both moderately and mildly retarded

children and adults when compared to their non-retarded matched controls on the emotion recognition task. All four group comparisons showed highly significant differences at the .001 level. However, significant levels for individual emotions varied for retarded children and their non-retarded controls. Small but significant differences were found in the recognition of fear between non-retarded controls and both moderately and mildly retarded children. Similarly a small but significant difference was found between moderately retarded children and their non-retarded controls in their ability to recognize disgust. Probable reasons for these small differences were discussed in Chapter 3. Overall, retarded subjects recognized facial expressions of emotion at a level of 51% accuracy compared to 81% accuracy for non-retarded controls. A percentile ranking of emotions showed a similar overall pattern for retarded and non-retarded subjects. Happiness and sadness were more frequently recognized than disgust and anger. Fear and surprise were the least recognized emotions.

A review of the literature failed to locate any study which examined the accuracy of a large sample of retarded persons in recognizing facial expressions of emotion. Similarly no attempt has been made to match retarded children and adults to their mental age controls. Therefore, a comparison of the present results is limited to the study conducted by Gray et al. (1983), which compared the abilities of mildly and moderately retarded adults in recognizing the six basic facial expressions of emotion. The present findings can be compared to other studies examining the abilities of non-retarded subjects in recognizing facial expressions of emotion. However, direct comparisons are not always

possible as different tasks and procedures were often used.

In the present study the extent to which mentally retarded persons are less adept at recognizing facial expressions of emotions was examined in greater detail than in the Gray et al (1983) study. This was made possible by comparing mentally retarded and non-retarded subjects on the same task and using the same procedure. Furthermore, a more direct comparison was made in the present study, with the retarded subjects being compared to their mental age matched controls.

The present results support and extend the findings of Gray et al (1983) that research methods used with non-retarded populations (e.g., Harrigan 1984) can be readily applied to the mentally retarded. Furthermore, the present study showed that the subjects with a greater degree of retardation than those in Gray et al (1983) can be assessed with respect to their accuracy in the recognition of facial expressions of emotion.

Partial support was obtained for Gray et al's (1983) claim that the ability to recognize facial expressions of emotion portrayed in photographs is correlated with intelligence. As previously mentioned, a clear trend emerged in the prevalence survey indicating that the ability to recognize facial expressions of emotion is related to intelligence. However, a statistical analysis in the matched comparison study showed that the difference was between the moderately and mildly retarded adults and not between children. A plausible explanation for the lack of a significant difference between the two groups of retarded children was attributed in part to their representing different populations. Specificially, the mildly retarded group was predominantly an institutionalized

sample of children whereas the moderately retarded group was a community sample of children. Arguably the socialization processes operating in these two environments, may have contributed to the discrepancies in the abilities of these two groups to recognize facial expressions of emotion. While these comments are speculative, they highlight the need to study distinct populations and further investigate Gray et al's (1983) claim that the ability to recognize facial expressions of emotion is correlated with intelligence.

The high accuracy rates obtained by non-retarded school children in recognizing facial expressions of emotion support the claims made by Izard (1971, 1977), and Ekman (1982) that the face can provide accurate information about emotion.

A notable feature during the validation of the video probe was that non retarded subjects could readily portray target emotions on request which were in turn accurately recognized with regard to the poser's intent. Approximately 25% of attempts to portray the target emotion were reliably identified by the 19 judges. Subjects portraying the emotions had not practised the task nor had they any previous experience in acting. The high level of agreement among the judges of the role plays adds further support to the claim that the face can provide accurate information about emotion.

Future studies using role plays of subjects portraying the six basic emotions could measure the face directly using a system such as the Facial Action Coding System (FACS) (Ekman and Friesen 1978). The judgement approach could be used in conjunction with a system such as F.A.C.S. thereby avoiding many of the pitfalls in using the judgement approach in isolation.

It was clearly demonstrated in Chapter 5 that six moderately retarded and one severely retarded subject were taught to markedly improve their ability to correctly label facial expressions of emotion portrayed in photographs. This ability generalized across photographs of different persons portraying the six basic facial expressions of emotion. In addition, labelling skills generalized to role plays judged to be typical of everyday life situations. Training gains were maintained at approximately the same level when subjects were retested 8 to 9 months later. A review of the literature failed to find a training procedure which has been developed and evaulated to teach mentally retarded persons to recognize facial expressions of emotion.

The results obtained in the present study have a number of implications for both retarded and non-retarded persons. Obviously, higher functioning retarded persons than those used in the present study could be taught to recognize facial expressions of emotion. Other non-retarded populations found to have a deficit in this skill (e.g., schizophrenics, emotionally disturbed children and abused children) could also be taught to recognize facial expressions of emotion. Indeed, non-retarded subjects could be systematically taught to improve their ability to recognize facial expressions of emotion. Harrigan (1984) has suggested that an emotion recognition task may be useful in child psychotherapy and in behavioural evaluations. Specificially she suggests that an assessment of a child's sensitivity to affect expressions of others would help in diagnosing psychopathology, evaluating treatment methods and determining clinical recovery. She also suggests that such information would be useful in determining a child's social skills and awareness of others.

Taking Harrigan's (1984) ideas one step further, if the ability to recognize facial expressions of emotion is found to be related to intelligence a test could be developed and used as an assessment device. Such information would be useful in behavioural evaluations highlighting specific deficits in emotion recognition.

As outlined in the general introduction several authors have claimed that the response skill model is too simplistic to account for the complexity of interpersonal behaviour (Morrison & Bellack 1981, Robertson et al 1984). As previously discussed, interpersonal skills can be seen as consisting of perception, cognition, performance, motivation and performance feedback (Argyle & Kendon 1967). It seems reasonable to suggest that one of the reasons social skills programmes have often failed to produce adequate generalization of skilled interpersonal behaviour is that subjects are not taught when and where to apply their newly acquired skills. Clearly, the ability to recognize facial expressions of emotions fits into Argyle and Kendon's (1967) conception of interpersonal skills, and as with other interpersonal skills, is learned. Being able to accurately recognize facial expressions of emotion assists in the process of learning "when" and "where" to apply newly taught social skills. Indeed, the present training procedure could be developed further to teach appropriate ways of responding given specific situations which relate to target emotions. It seems the ability to correctly recognize facial expressions of emotion is an important skill necessary to aid the generalization of social skills. For example, if teaching interpersonal skills such as dealing with another person's anger, it would be

imperative that the subject could recognize the facial expression for anger if generalization to everyday life situations was to occur.

Further research is needed to clarify whether the ability to recognize facial expressions of emotion is related to intelligence. Some form of measurement in the natural environment is also needed, thus providing an additional evaluation of the usefulness and potential benefits of training.

Briefly, a number of recommendations with regard to the design and procedures used in the present series of studies are outlined. When teaching subjects to recognize facial expressions of emotion a large number of photographs of different subjects portraying the six basic facial expressions of emotion should be used to enhance rapid generalization. Only a small number of photographs were used in the present study which may have limited generalization. Subjects quickly learned to identify the demonstration photographs but were slow to generalize to the test photographs. Additionally, providing feedback as to the accuracy of their judgements on the test photographs may enhance learning. This was not done in the present training study as generalization across people would not have been demonstrated.

A more objective means of distinguishing between subjects who demonstrated or failed to demonstrate an understanding of the six basic emotions needs to be developed. A brief questionnaire based on the understanding of non-retarded children's concepts of the six basic emotions could be developed and normed.

A final refinement could be made to the training

procedure. A component analysis would determine whether just overcorrection would be sufficient for training or if it is necessary to teach the rules that relate specific facial movements to target emotions.

There are a number of reasons for the lack of studies concerning mentally retarded persons' abilities to recognize facial expressions of emotion. There is little literature demonstrating that it is possible to study the recognition of emotion with mentally retarded populations (see Strongman, in press). The notable exception, Gray et al (1983), demonstrated that behavioural measures used in the study of non-retarded populations could be transposed to the study of retarded adults. The present study extended this finding to retarded children and to severely mentally retarded children and adults.

It is only relatively recently (1960s - 1970s) that there has been a resurgence of interest in the study of emotion. However a great deal of confusion surrounds the concept of emotion and an agreed-upon definition is yet to emerge. Furthermore, the theoretical basis linking facial expressions and emotion is contentious. Some theorists claim that facial expressions are not related to emotions, while others claim there is a direct link. Given this controversy it is little wonder that many would-be researchers are discouraged from studying this area. Certainly, any researchers approaching the area from an interest in mental retardation with little understanding of emotion would be daunted by the task at hand. Conversely with the current emphasis on cognitive theories of emotion the study of emotions in the mentally retarded would appear problematic to anyone approaching the area from an interest in emotion.

More generally, if one considers the neglect of the mentally retarded in the acquisition of a wide range of skills it is hardly surprising that such a specific skill in such a controversial area has been overlooked or avoided.

As previously discussed, relating facial expressions of emotion to a theory of emotion is difficult, due to the inadequacies of theories in their ability to explain emotion as it is expressed in everyday life. However until the expression of emotions is addressed more fully in the context of everyday life situations a number of issues will remain unanswered. For example, whether facial expressions of emotion are an ancient system of communication that is used to communicate major categories of human experience (cognitive evaluations) or purely innate involuntary affective responses in the face, or just voluntarily produced expressions. A theory of emotion must address how facial expressions of emotion are expressed in everyday life situations. At the very least a degree of universality of facial expressions of emotion is accepted by many writers. Facial expressions of emotion have shared meaning. However, the exact relationship between emotion and facial expressions of emotion is yet to be agreed upon by theorists working in the area.

The findings of the present series of studies have a number of implications for teachers, caregivers and parents of mentally retarded persons. A skill which is learned incidentally by most people needs to be systematically taught to those who are mentally retarded. At one level, an effort could be made in specific social situations to incidentally teach the recognition of facial expressions of emotion. However such instructions would have to be at a simple level because as already noted mentally retarded

subjects fail to learn these skills adequately in the complexity of everyday life interactions. At another level training needs to be explicit, as demonstrated in the present training procedure.

As discussed in the introduction the ability to recognize facial expressions of emotion is only one facet of the process involved in recognizing emotions. The present study is a small beginning in the research that could be done in the area of emotion recognition and the mentally retarded. A package needs to be developed and evaluated that incorporates other specific factors that are involved in the recognition of emotion and indeed relate to emotions in the mentally retarded in general.

Mentally retarded persons should be taught to recognize various situations which evoke specific emotions and the consequences of different emotional reactions to those situations. The learning of such skills would have direct implications for anger management. The present study focussed on intense expressions of emotion. Mentally retarded persons could be taught to recognize and label emotions of various intensities. Blends of emotions could be taught. Teaching the recognition of sounds which are related to specific emotions may help mentally retarded persons to recognize emotions in everyday life, for example, at a simple level, teaching that one may laugh when happy, or raise one's voice when angry. It may be possible to teach more subtle changes in voice. A large number of mentally retarded persons need to be taught the meanings of various emotions. Mentally retarded persons could be taught to become more aware of their subjective feelings and moods which may be created and influenced by a series of emotional events. Another area which needs

investigating is the extent to which retarded persons can portray the various emotions. The use of gestures, as they relate to specific emotions, is another area which needs investigation.

In conclusion, the present study showed that mentally retarded children and adults are poor at recognizing facial expressions of emotion. Significant differences were found between retarded children and adults when compared to their non-retarded controls matched on age and sex. Partial support was obtained for the claim that the ability to recognize facial expressions of emotion is related to intelligence. Systematic training was provided and response generalization was measured across photographs and video presentations of the six basic emotions. The results showed that young mentally retarded adults could be trained to recognize facial expressions of emotion and maintain this skill for up to 8 to 9 months.

# REFERENCES


Allport, F.H. (1924). Social psychology. Boston: Houghton Mifflin.

Anderson, P.A. & Buller, D.B. (1981). Judging the accuracy of facial expressions: A methological inquiry. Paper presented at the Annual Meeting of the Eastern Communication Association (Ocean City, MD 24-26).

Argyle, M., & Kendon, A. (1967). The experimental analysis of social performance. In L. Berkowtiz (Ed.), Advances in Experimental Social Psychology. Vol.3. (pp.55-91). New York: Academic Press.

Asch, S.E. (1952). Social Psychology. Englewood Cliffs, N.J.: Prentice-Hall.

Baer, D.M., Wolf, M.M., & Risley, J.R. (1968). Some current dimensions of applied behaviour analysis. Journal of Applied Behaviour Analysis, 1, 91-97.

Bernstein, G.S. (1981). Research issues in training interpersonal skills for the mentally retarded. Education and Training of the Mentally Retarded, 16, 70-74.

Borke, H. (1971). Interpersonal perception of young children: Egocentrism or empathy? Developmental Psychology, 5, 263-269.

Boucher, J.D., & Brandt, M.E. (1981). Judgement of emotion: American and Malay antecedents. Journal of Cross-Cultural Psychology, 12, 272-283.

Boucher, J.D., & Carlson, G.E. (1980). Recognition of facial expression in three cultures. Journal of Cross-Cultural Psychology, 11, 263-280.

Bruner, J.S., & Tagiuri, R. (1954). The perception of people. In G. Lindzey (Ed.), Handbook of Social Psychology Vol, 2. (pp.634-654). Reading, Mass.:' Addison-Wesley.

Camras, L.A., Grow, J.C., & Ribordy, S.C. (1983). Recognition of emotional expression by abused children. Journal of Clinical Child Psychology, 12 325-328.

Carlson, C.R., Gantz, F.P., & Masters, J.C. (1983). Adults' emotional states and recognition of emotion in young children. Motivation and Emotion, 7, 81-101.

Cuvo, A.J. (1979) The multiple baseline design in instructional research: Pitfalls of measurement and procedural advantages. American Journal of Mental Deficiency, 1979, 84, 219-228.

Darwin, C. (1872). The expressions of the emotions in man and animals. London: John Murray.

Dickey, R.V., & Knower, F.H. (1941). A note on some ethnological differences in recognition of simulated expressions of the emotions. American Journal of Sociology, 47, 190-193.

Dougherty, F.E., Bartlett, E.S., & Izard, C.E. (1974). Responses of schizophrenics to expressions of the fundamental emotions. Journal of Clinical Psychology, 30, 243-246.

Ducci, L., Arcuri, L., Georgis, T.W., Sineshaw, T. (1982). Emotion recognition in Ethiopia: The effect of familiarity with western culture on accuracy of recognition. Journal of Cross-Cultural Psychology, 13, 340-351.

Edwards, R., Manstead, A.S.R., & MacDonald, C.J. (1984). The relationship between children's sociometric status and ability to recognize facial expressions of emotion. European Journal of Social Psychology, 14, 235-238.

Ekman, P. (Ed.). (1982). Emotion in the human face (2nd ed.) Cambridge: Cambridge University Press.

Ekman, P., & Friesen, W.V. (1971). Constants across cultures in the face and emotion. Journal of Personality and Social Psychology, 17, 124-129.

Ekman, P., & Friesen, W.V. (1975). Unmasking the face: A guide to recognizing emotions from facial clues. Englewood Cliffs, N.J.: Prentice-Hall.

Ekman, P., & Friesen, W.V. (1976). Measuring facial movement. Environmental Psychology and Nonverbal Behaviour, 1, 56-75.

Ekman, P., & Friesen, W.V. (1978). Facial action coding system (FACS): A technique for the measurement of facial action. Palo Alto, Ca: Consulting Psychologists Press.

Ekman, P., Friesen, W.V., & Ellsworth, P. (1972). Emotion in the human face. Elmsford, N.Y.: Pergamon Press.

Ekman, P., Friesen, W.V., & Tomkins, S.S. (1971). The facial affect scoring technique (FAST), Palo Alto, Ca: Consulting Psychologists Press.

Ekman, P., & Oster, H. (1979). Facial expressions of emotion. Annual Review of Psychology, 30, 527-55.

Ekman, P., Sorenson, E.R., & Friesen, W.V. (1969). Pan cultural elements in facial displays of emotion. Science, 164, 86-88.

Felleman, E.S., Barden, C.R., Carlson, C.R., Rosenberg, L., & Masters, J.C. (1983). Children's and adults' recognition of spontaneous and posed emotional expressions in young children. Developmental Psychology 19,405-413.

Field, T.M. & Walden, T.A. (1982). Production and discrimination of facial expressions by preschool children. Child Development, 53, 1299-1310.

Fraser, W.I. & Grieve, R. (1981). Communicating with normal and retarded children. Bristol: Wright.

Frijda, N.H. (1958). Facial expression and situational cues. Journal of Abnormal Social Psychology, 57, 149-154.

Frijda, N.H. (1969). Recognition of emotion. In L. Berkowitz (Ed.), Advances in Experimental Social Psychology. Vol. 4. (pp.167-223). New YOrk: Academic Press.

Frois-Wittman, J. (1930). The judgement of facial expression. Journal of Experimental Pychology, 13, 113-151.

Fulcher, J.S. (1942). "Voluntary" facial expression in blind and seeing children. Archives of Psychology, 38.

Gottman, J., Gonso, J., & Rasmussen, B. (1975). Social interaction, social competence, and friendship in children. Child Development, 46, 709-718.

Gray, J.M., Fraser W.L., & Leudar, I. (1983). Recognition of emotion from facial expression in mental handicap. British Journal of Psychiatry, 142, 556-571.

Grossman, H.J. (1983) Classification in mental retardation Washington D.C.: American Association on Mental Deficiency.

Guilford, J.P. (1929). An experiment in learning to read facial expression. Journal of Abnormal and Social Psychology, 24, 191-202.

Harrigan, J.A. (1984), The effects of task order on children's identification of facial expressions. Motivation and Emotion, 8, 157-169.

Hiatt, S.W., Campos, J.J., & Emde, R.N. (1979). Facial patterning and infant emotional expression: Happiness, surprise, and fear. Child Development, 50, 1020-1035.

Hughes, R. Jr., Tingle, B.A., & Sawin, D.B. (1981). Development of empathic understanding in children. Child Development, 52, 122-128.

Izard, C.E. (1971). The face of emotion. New York: Appleton-Century-Crofts.

Izard, C.E. (1977). Human Emotions. New York: Plenum.

Izard, C.E. (1982). Measuring emotions in infants and children. New York: Cambridge University Press.

Izard, C.E., & Dougherty, L.M. (1982). Two complementary systems for measuring facial expressions in infants and children. In C.E. Izard, (Ed.) Measuring Emotions in Infants and Children. New York: Cambridge University Press.

Izard, C.E., Huebner, R.R. Risser, D., McGinness, G.C. & Dougherty, L.M. (1980). The young infants ability to produce distrete emotion expressions. Developmental Psychology, 16, 132-140.

Izard, C.E. & Tomkins, S.S. (1966). Affect and behaviour: Anxiety as a negative affect. In C.D. Spielberger, (Ed.), Anxiety and Behaviour. New York: Academic Press.

Jenness, A. (1932). The effects of coaching subjects in the recognition of facial expressions. Journal of General Psychology, 7, 163-178.

Kazdin, A.E. (1982), Single-case research designs. New York: Oxford University Press.

Kilbride, J.E., & Yarczower, M. (1980). Recognition and imitation of facial expressions. A cross-cultural comparison between Zambia and the United States. Journal of Cross-Cultural Psychology, 11, 281-296.

Knudsen, H.R., & Muzekari, L.H. (1980). The effect of verbal statements of context on facial expressions of emotion. Paper presented at the Annual Meeting of the International Communication Association. (30th, Acapulco, Mexico, May 18-23).

La Barre, W. (1947). The cultural basis of emotions and gestures. Journal of Personality, 16, 49-68.

Landis, C. (1924). Studies of emotional reactions: II General behaviour and facial expression. Journal of Comparative Psychology, 4, 447-509.

Landis, C. (1929). The interpretation of facial expression in emotion. Journal of General Psychology, 2, 59-72.

Leathers, D.G., & Emigh, T.H. (1980). Decoding facial expressions: A new test with decoding norms. The Quarterly Journal of Speech, 66, 418-436.

Levy, L.H., Orr, T.B., & Rosenzewig, S. (1960). Judgements of emotion from facial expressions by college students, mental retardates and mental hospital patients. Journal of Personality, 28, 342-349.

Lewis, M., & Michalson, L. (1985). Faces as as signs and symbols. In The development of expressive behaviour: Biology-environment interactions Academic Press.

Malatesta, C.Z., & Haviland, J.M. (1982). Learning display rules: The socialization of emotion expression in infancy. Child Development, 53, 991-1003.

Mandler, G. (1976). Mind and emotion. New York: Wiley.

Mandler, G. (1982). The construction of emotion in the child. In C.E. Izard (Ed.), Measuring Emotions in Infants and Children. New York: Cambridge University.

Mehrabian, A. (1972). Nonverbal communication. In J.K. Cole, (Ed.), Nebraska Symposium on Motivation Vol. 19. (pp. 107-161). Lincoln, N.E.: University of Nebraska Press.

Mittenecker, (1960). Article in German. In C.E.Izard, (Ed.), The Face of Emotion. New York: Appleton-Century-Crofts.

Morrison, R.L., & Bellack, A.S. (1981). The role of social perception in social skill. Behaviour Therapy, 12, 69-79.

Muzekari, L.H., & Bates, M.E. (1977). Judgement of emotion among chronic schizophrenics. Journal of Clinical Psychology, 33, 662-666.

O'Malley, J.M. (1977). Research perspective on social competence. Merill-Palmer Quarterly, 23, 29-44.

Osgood, C.E. (1966). Dimensionality of the semantic space for communication via facial expressions. Scandinavian Journal of Psychology, 7, 1-30.

Plutchik, R. (1962). The emotions: Facts, theories, and a new model. New York: Random House.

Reichenbach, L., & Masters, J.C. (1983). Children's use of expressive and contextual cues in judgements of emotion. Child Development, 54, 993-1004.

Rinn, W.E. (1984). The neuropsychology of facial expression: A review of the neurological and psychological mechanisms for producing facial expressions. Psychological Bulletin, 95, 52-77.

Robertson, I., Richardson, A.M., & Youngson, S.C. (1984). Social Skills training with mentally handicapped people: A review. British Journal of Clinical Psychology, 23, 241-264.

Rothenberg, B.B. (1970). Children's social sensitivity and the relationship to interpersonal competence, interpersonal comfort, and intellectual level. Developmental Psychology, 2, 335-350.

Scherer, K.R., & Ekman, P. (1982). Handbook of methods in nonverbal behaviour research. Cambridge University Press.

Scholsberg, H. (1954). Three dimensions of emotion Psychological Review, 61, 81-88.

Sherman, M. (1927). The differentiation of emotion responses in infants: I. Judgements of emotional responses from motion pictures views and from actual observation. Journal of Comparative Psychology, 7, 265-284.

Singh, N.N., & Winton, A.S.W. (1983). Social skills training with institutionalized severely and profoundly mentally retarded persons, Applied Research in Mental Retardation, 4, 583-398.

Stenberg, G.R., & Campos, J.J., & Emde, R.N. (1983). The facial expressions of anger in seven-month-old infants. Child Development, 54, 178-184.

Strongman, K.T. (1978). The psychology of emotion (2nd ed.) Chicester: Wiley.

Strongman, K.T. (in press). Emotion in the mentally retarded. Australia and New Zealand Journal of Developmental Disabilities.

Thayer, S. (1979). The effect of expression sequence and expressor identify on judgements of the intensity of facial expression. Paper presented at the Annual Meeting of the American Psychological Association (87th. New York, NY. Sept. 1-5).

Thompson, J. (1941). Development of facial expression of emotion in blind and seeing children. Archives of Psychology, 37.

Tomkins, S.S. (1962). Affect, imagery, consciousness (Vol.1. The positive affects). New York: Springer.

Tomkins, S.S. (1963). Affect, imagery, consciousness (Vol.2. The negative affects). New York: Springer.

Tomkins, S.S. (1982). Affect, imagery, consciousness (Vol.3. Cognition and affect). New York: Springer.

Tomkins, S.S. & McCarter R. (1964). What and where are the primary affects? Some evidence for a theory. Perceptual and Motor Skills, 18, 119-158.

Trandis, H.C., & Lambert, W.V. (1958). A restatement and test of Scholsberg's theory of emotion with two kinds of subjects from Greece. Journal of Abnormal and Social Psychology, 56, 321-328.

Vosk, B.N., Forehand, R., Figueroa, R. (1983). Perception of emotions by accepted and rejected children. Journal of Behavioural Assessment, 5, 151-160.

Walden, T.A. & Field, T.M. (1982). Discrimination of facial expressions by preschool children. Child Development, 53, 1312-1319.

Walker, E., McGuire, M., & Bettes, B. (1984). Recognition and identification of facial stimuli by schizophrenics and patients with affective disorders. British Journal of Clinical Psychology, 23, 37-44.

Walker, E., Marwit, S.J., & Emory, E. (1980). A cross-sectional study of emotion recognition in schizophrenics. Journal of Abnormal Psychology, 89, 428-436.

Wehman, P.H. (1975). Toward a social skills curriculum for developmentally disables clients in vocational settings. Rehabilitation Literature, 36, 342-348.

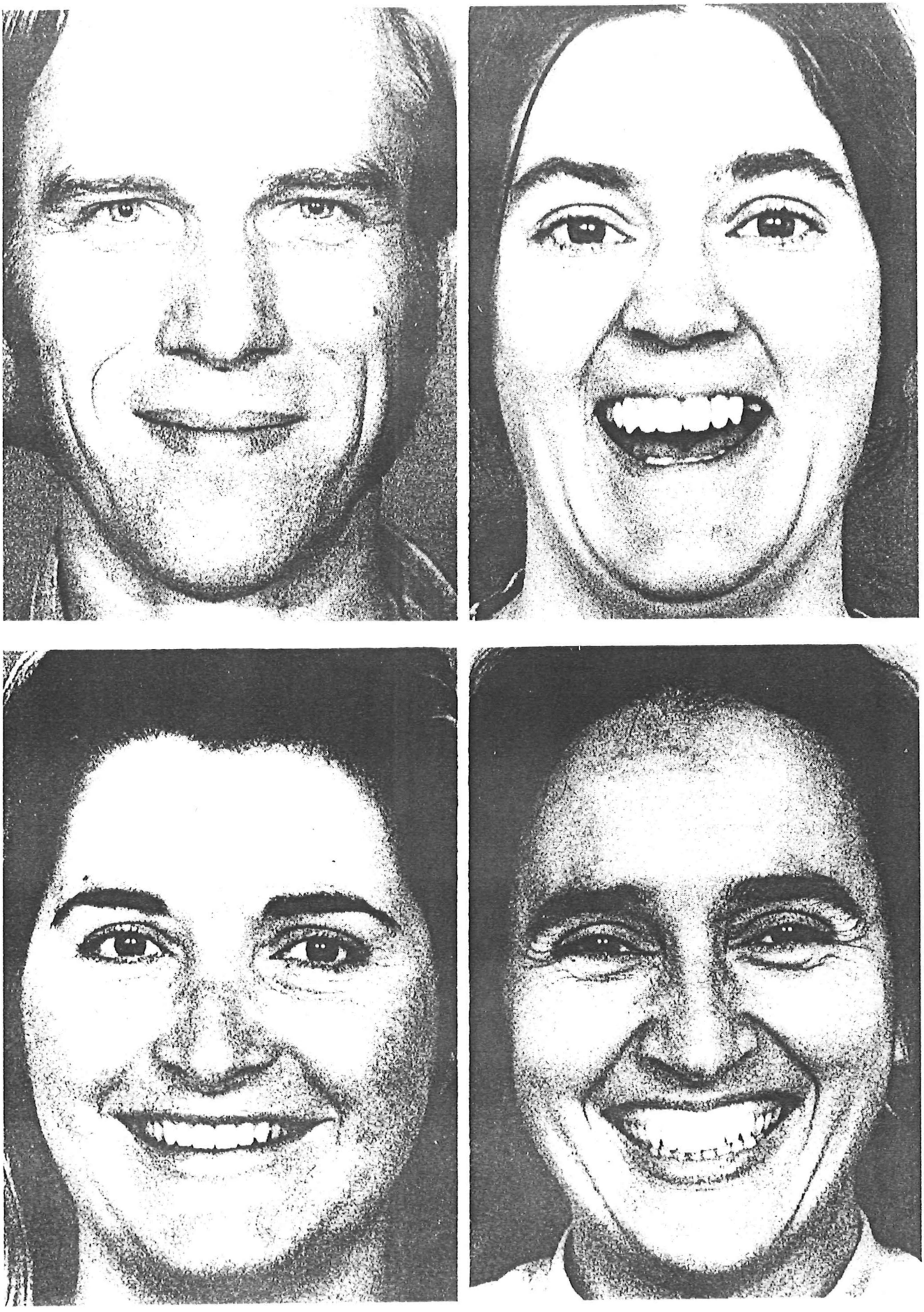
Woodworth, R.S. (1980). Experimental Psychology. New York: Henry Holt.

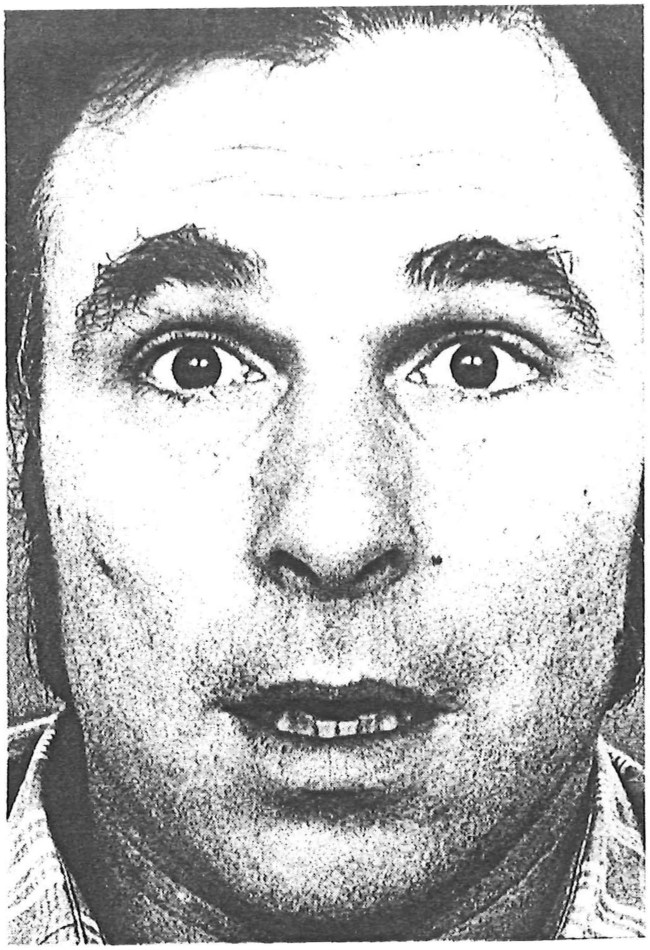
Woodworth, R.S. & Schlosberg, H. Experimental Psychology (Rev. ed.) New York: Henry Holt.

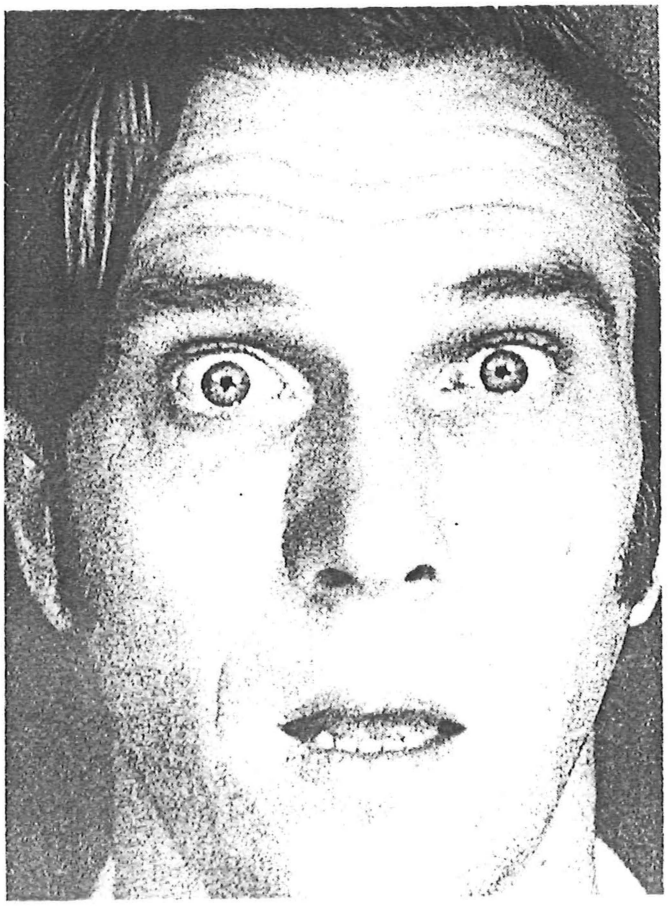
Zabel, R.H. (1979). Recognition of emotions in facial expressions by emotionally disturbed and nondisturbed children. Psychology in Schools, 16, 119-126.

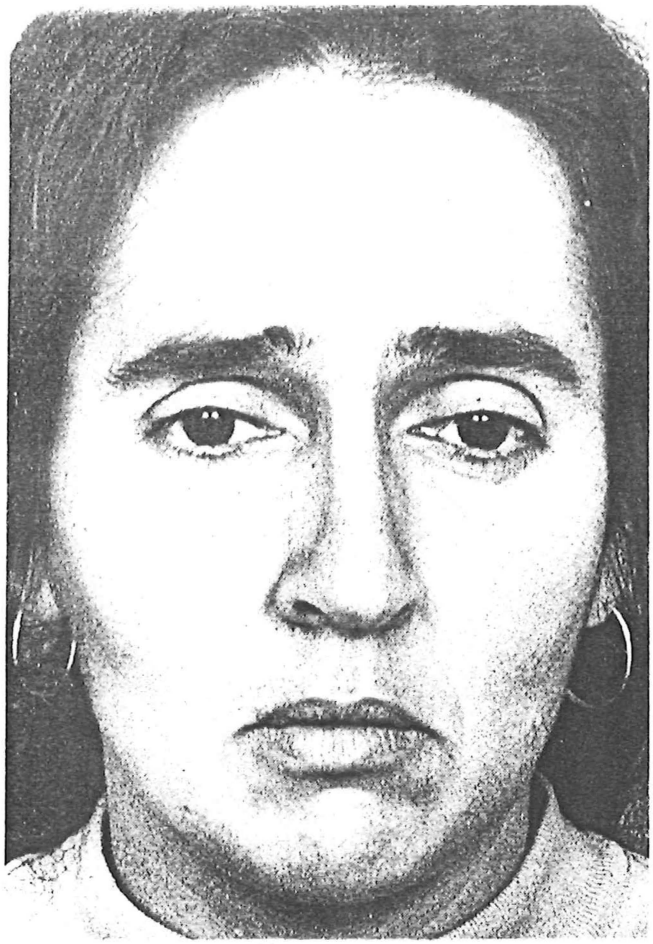
# APPENDIX I

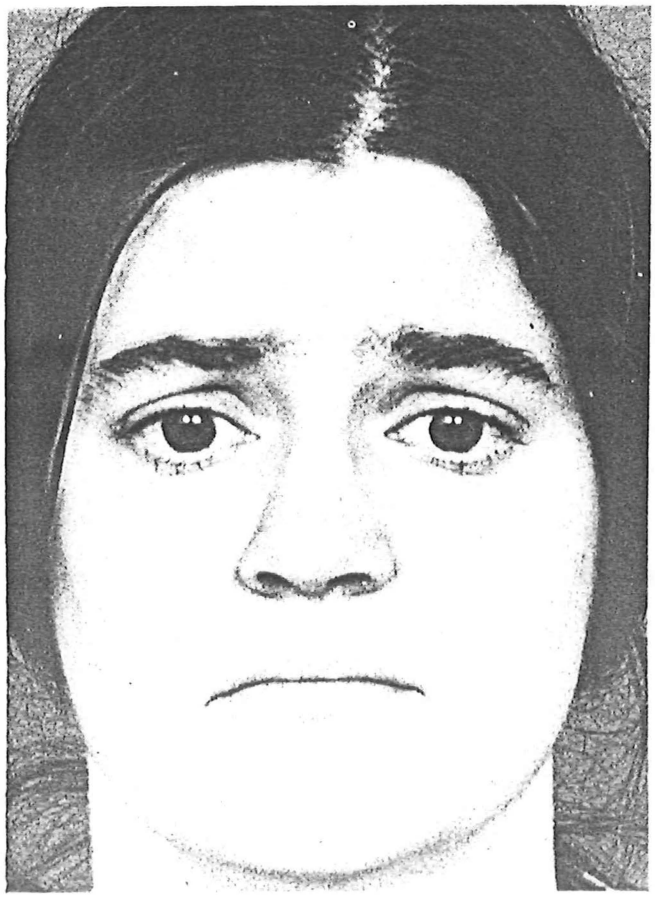
## Photographs of the Six Basic Facial Expressions of Emotion

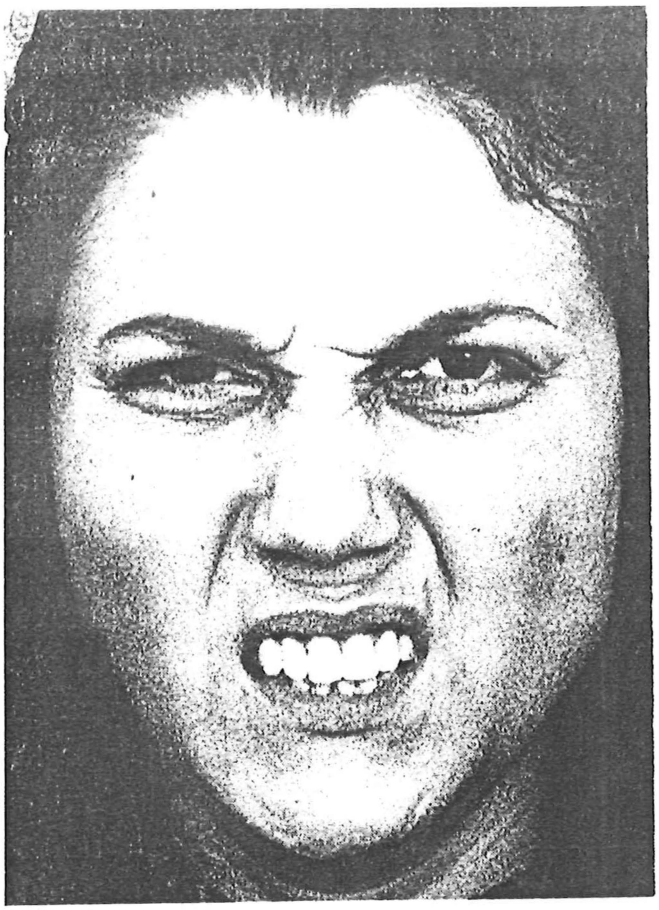


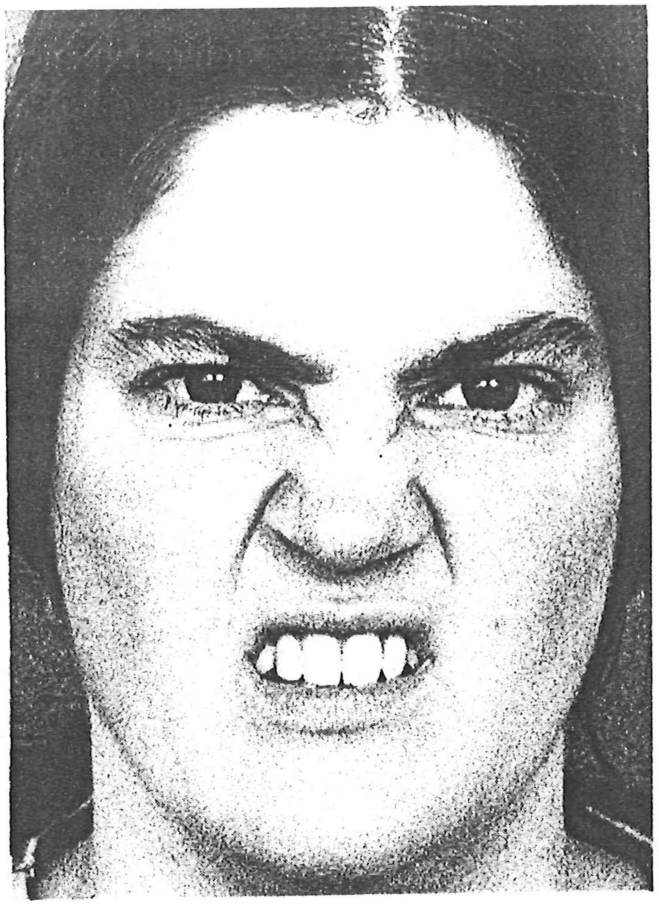


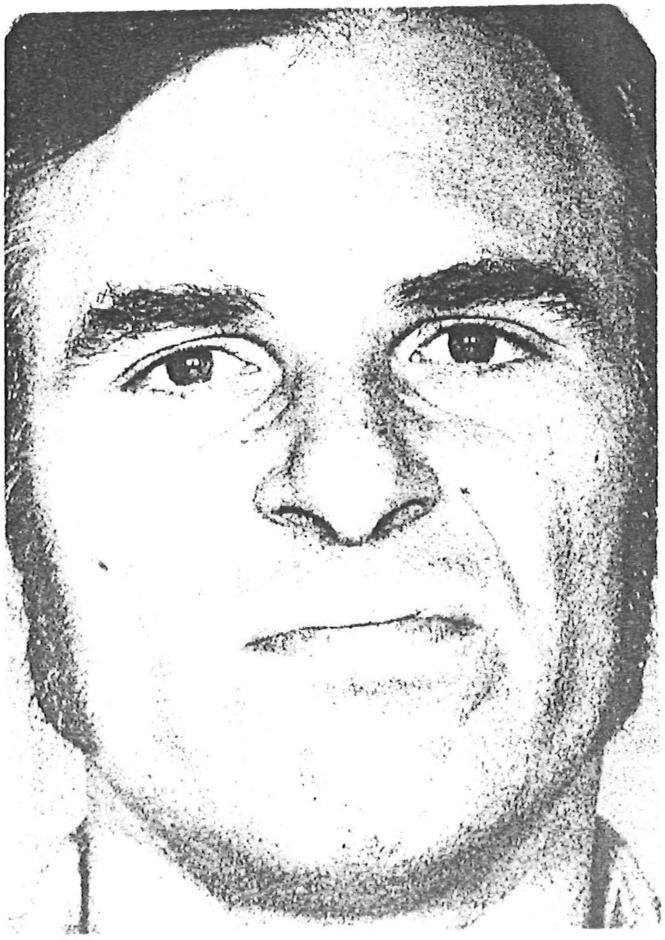


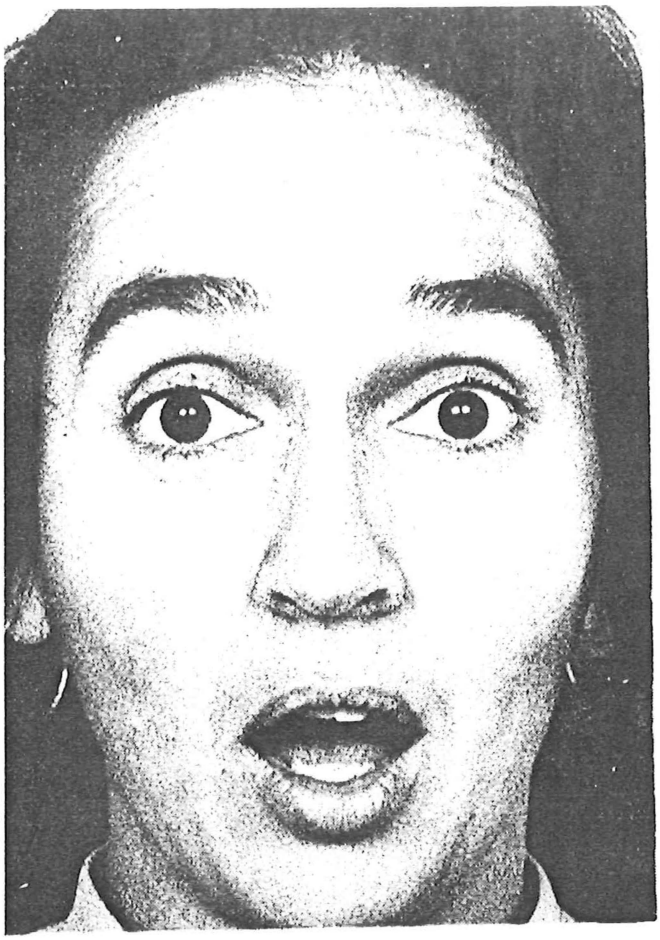


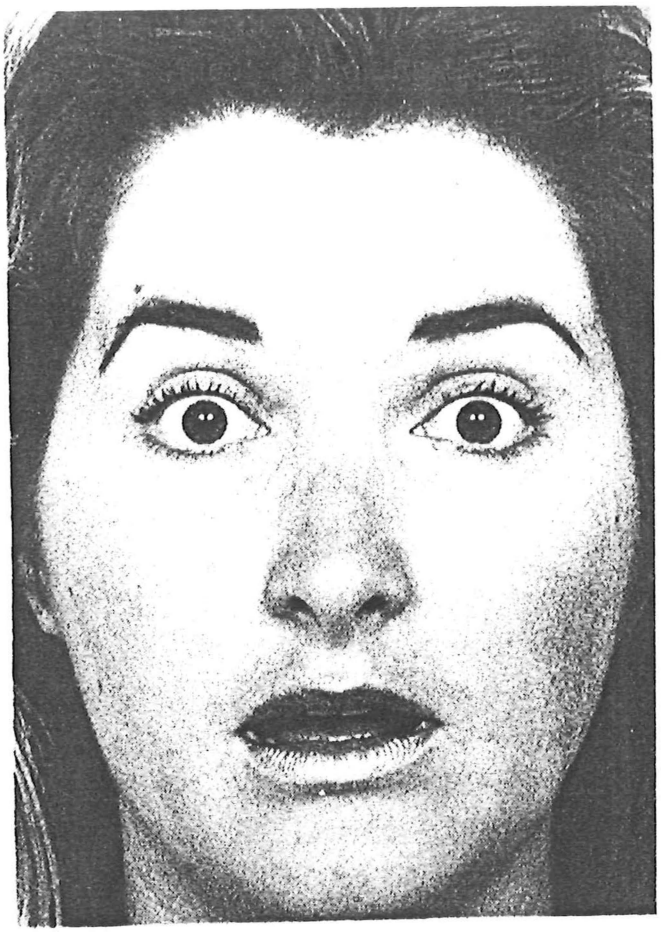


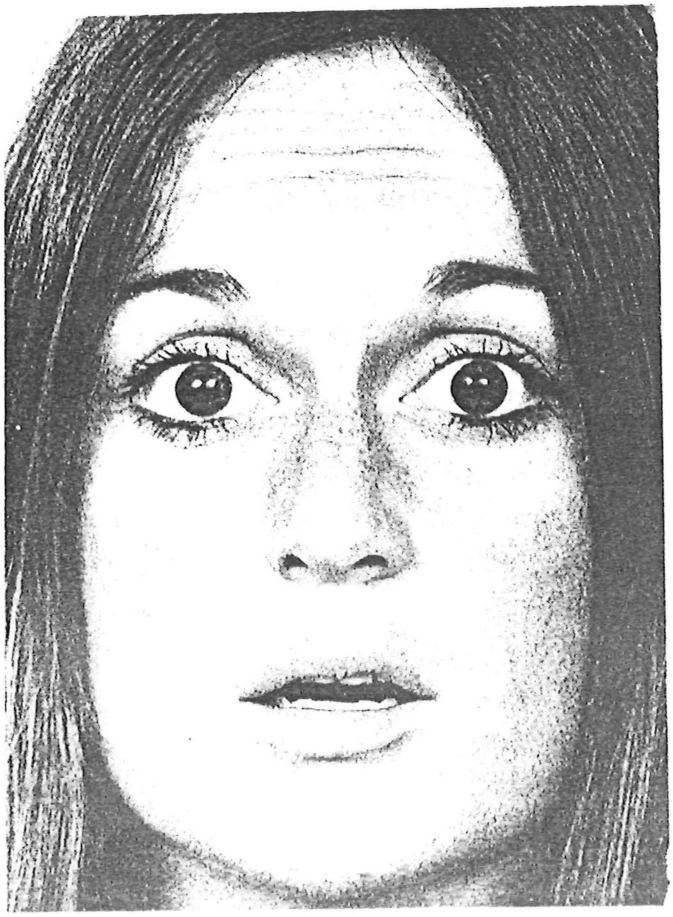


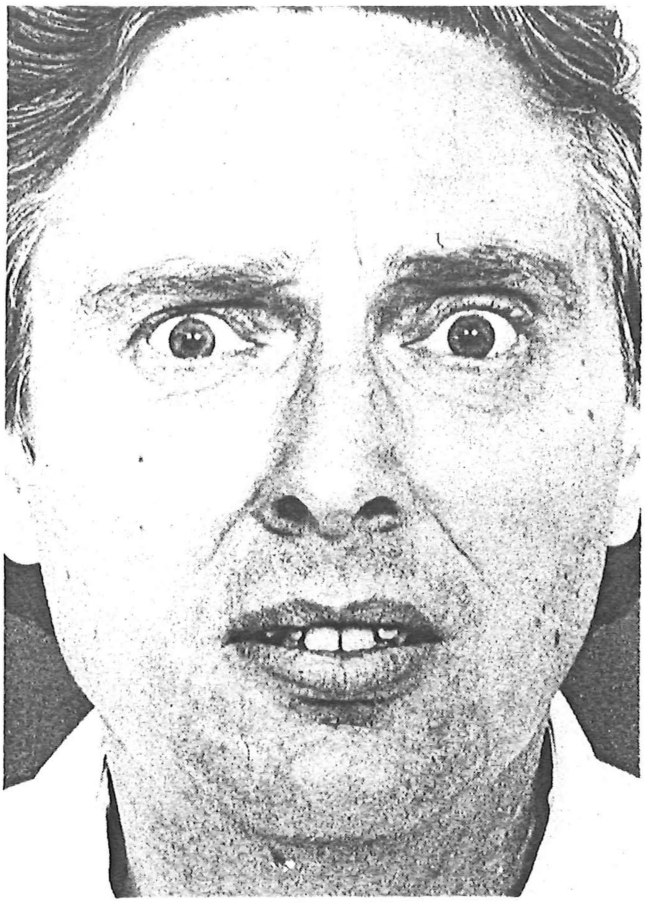


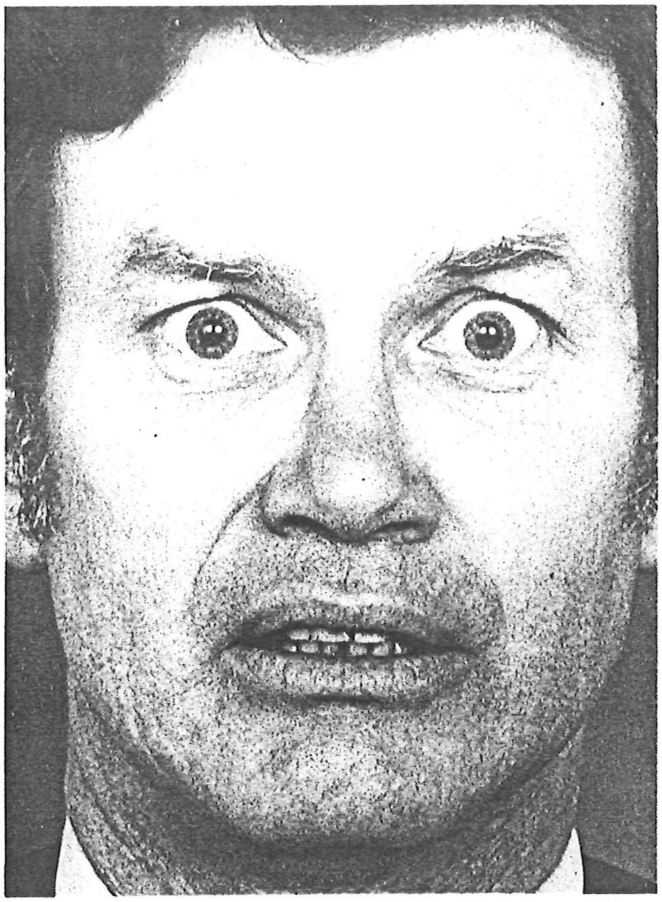


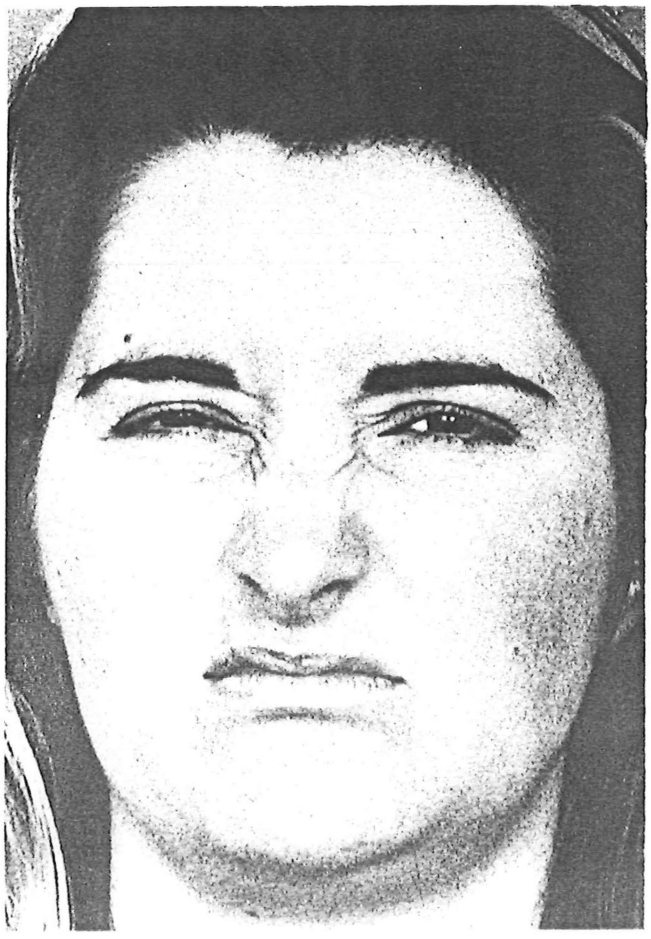


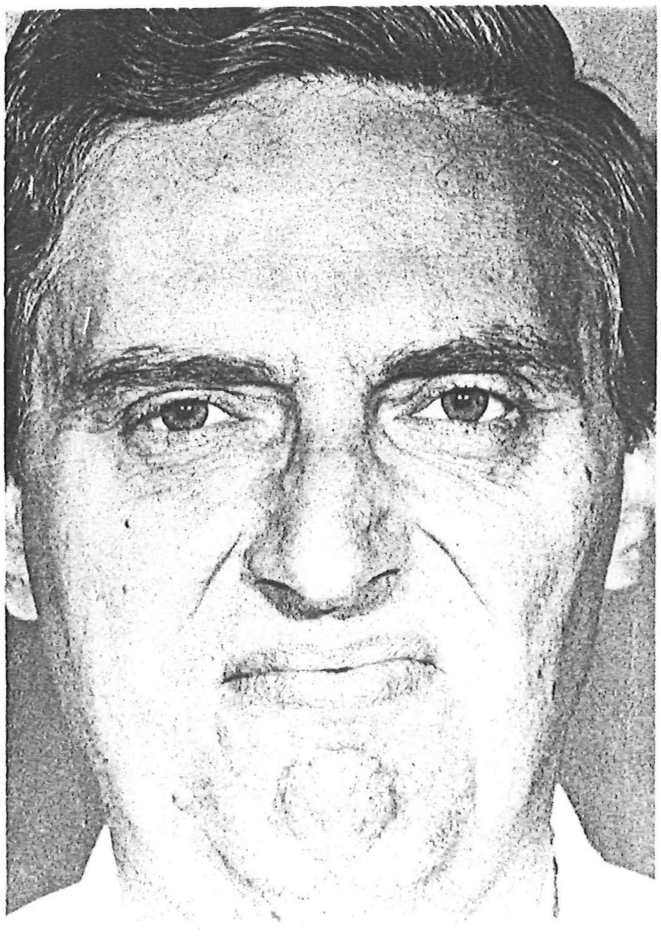


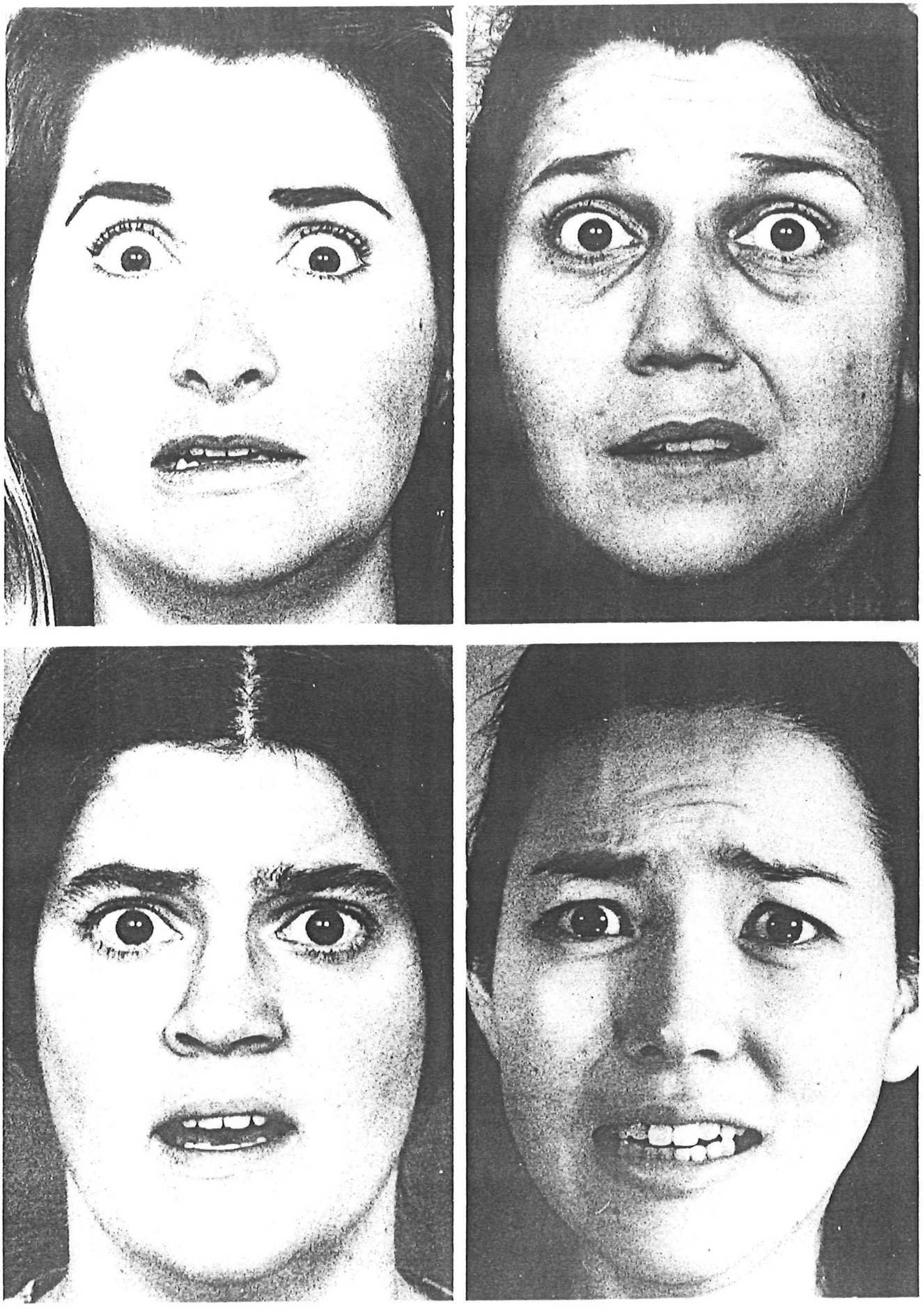


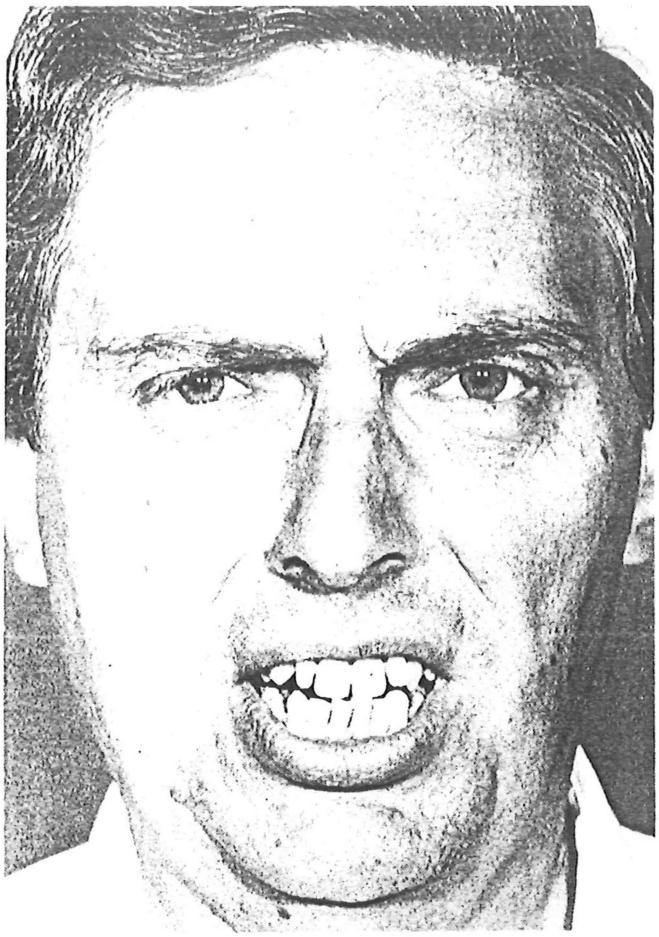


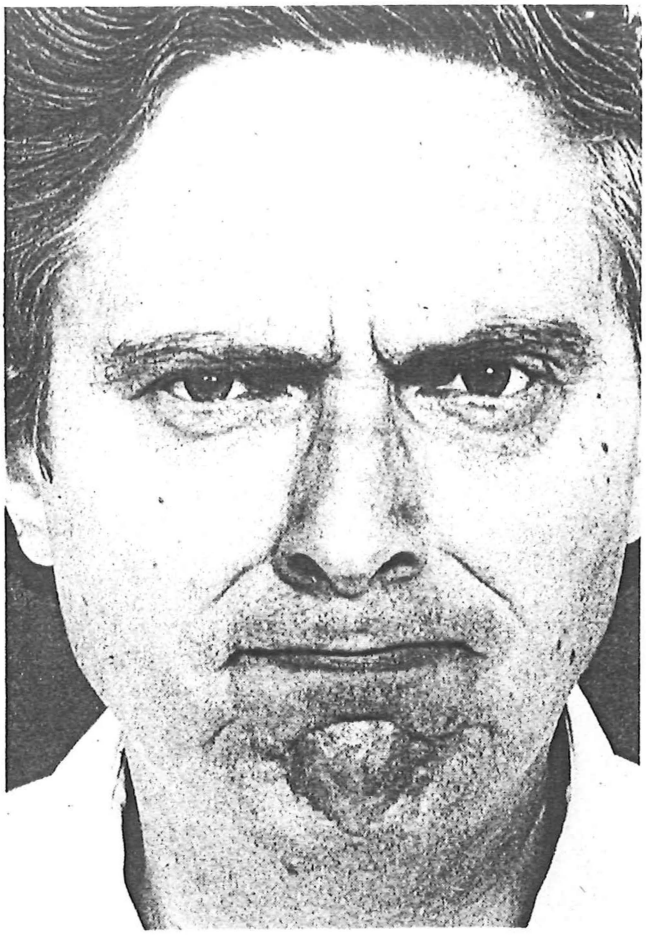


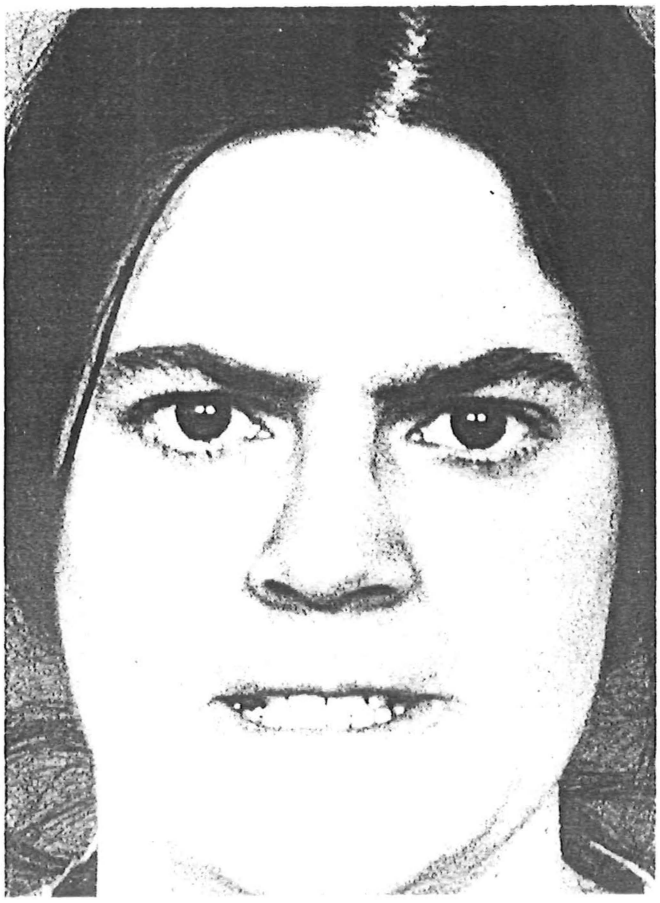


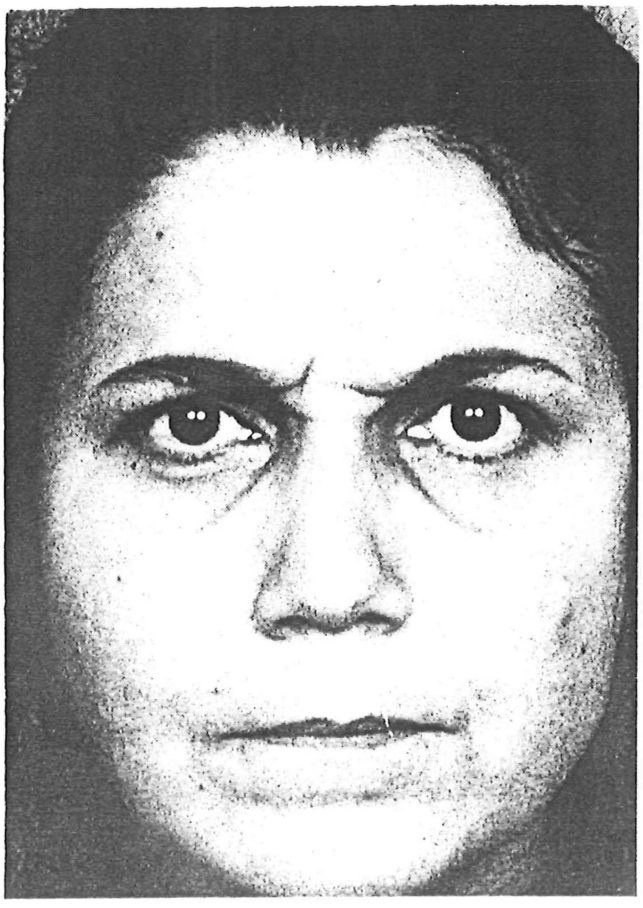


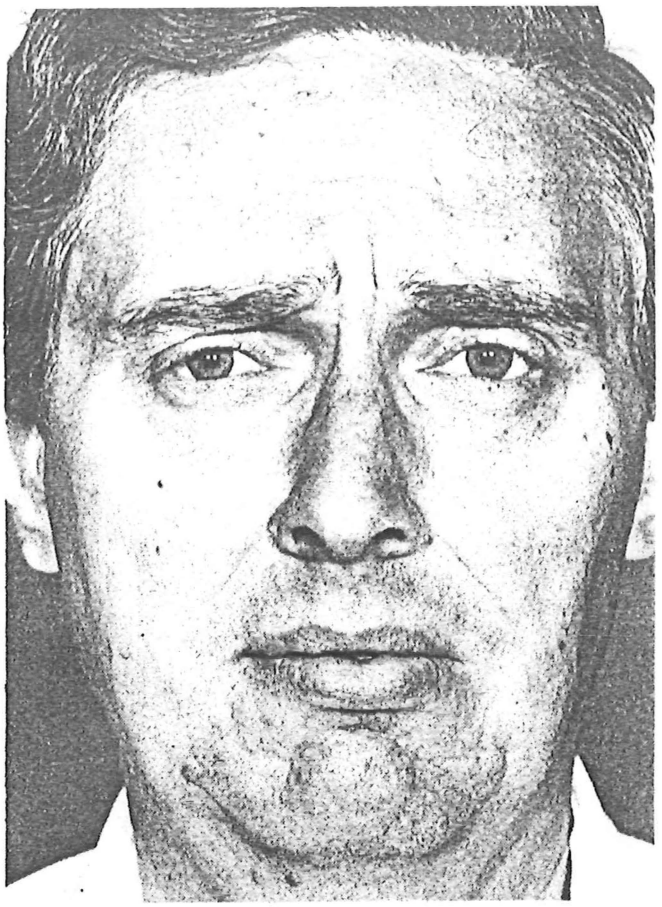


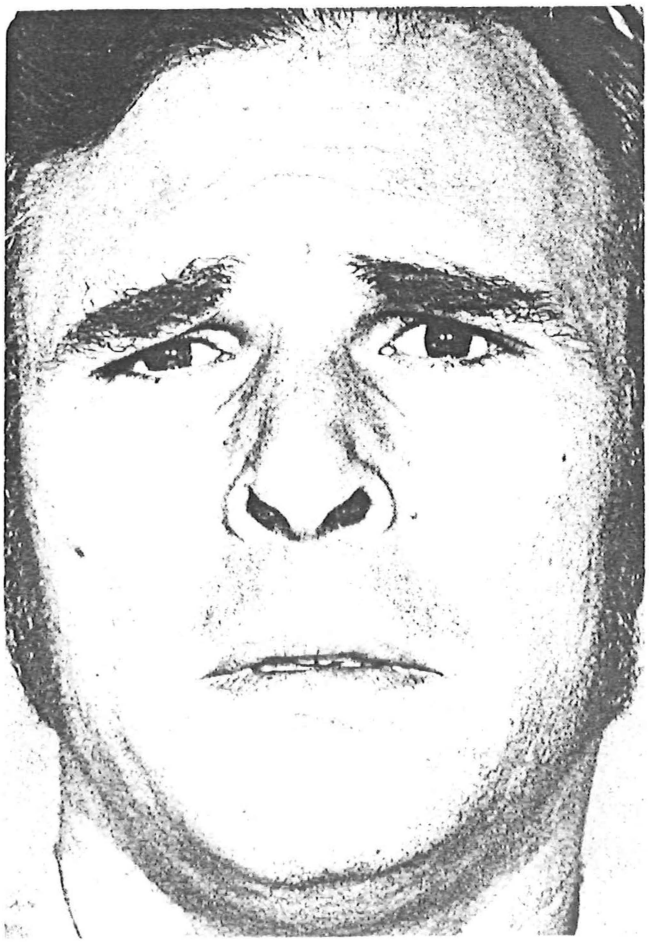


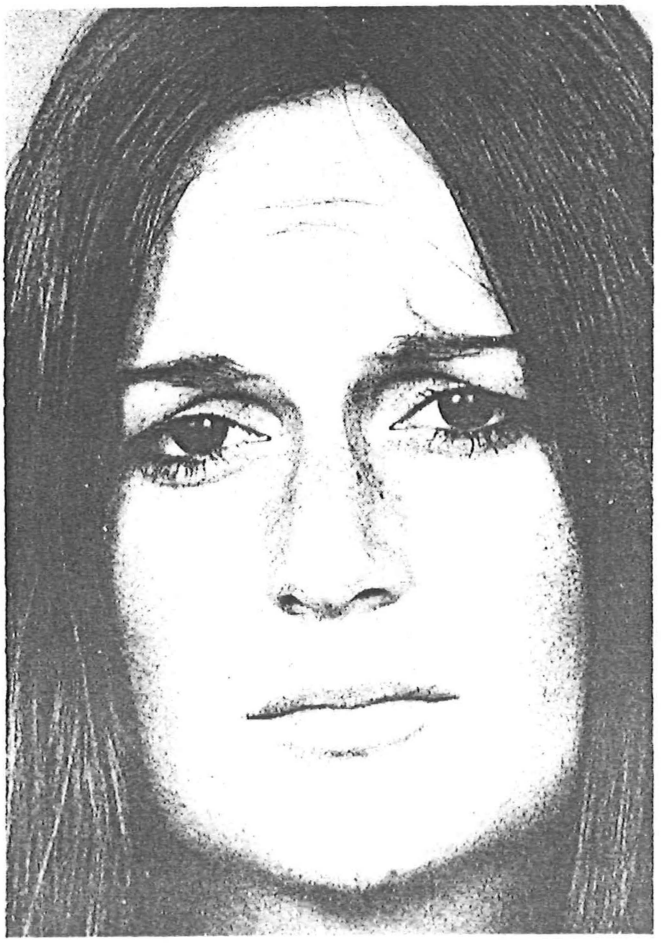


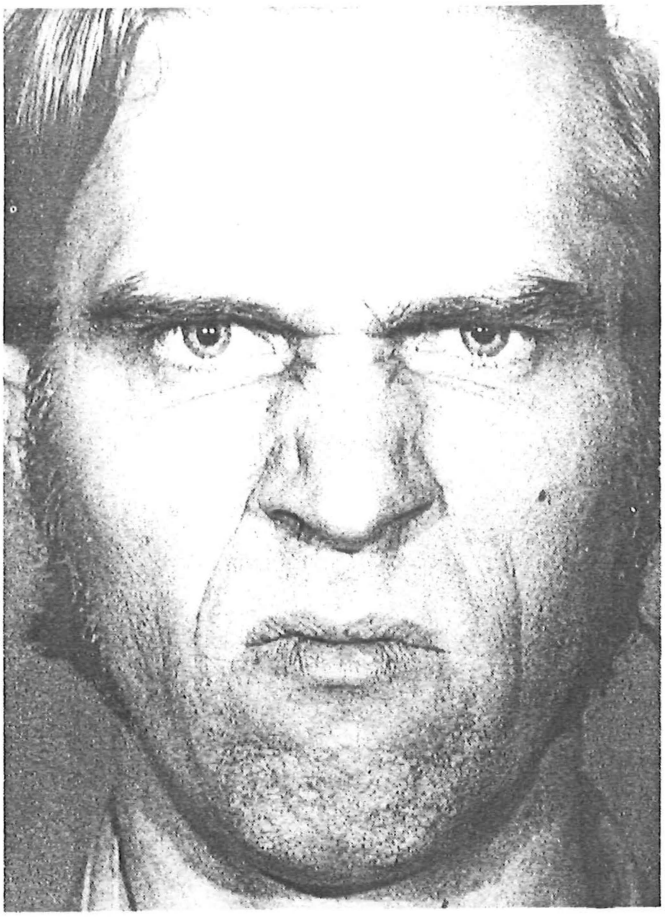


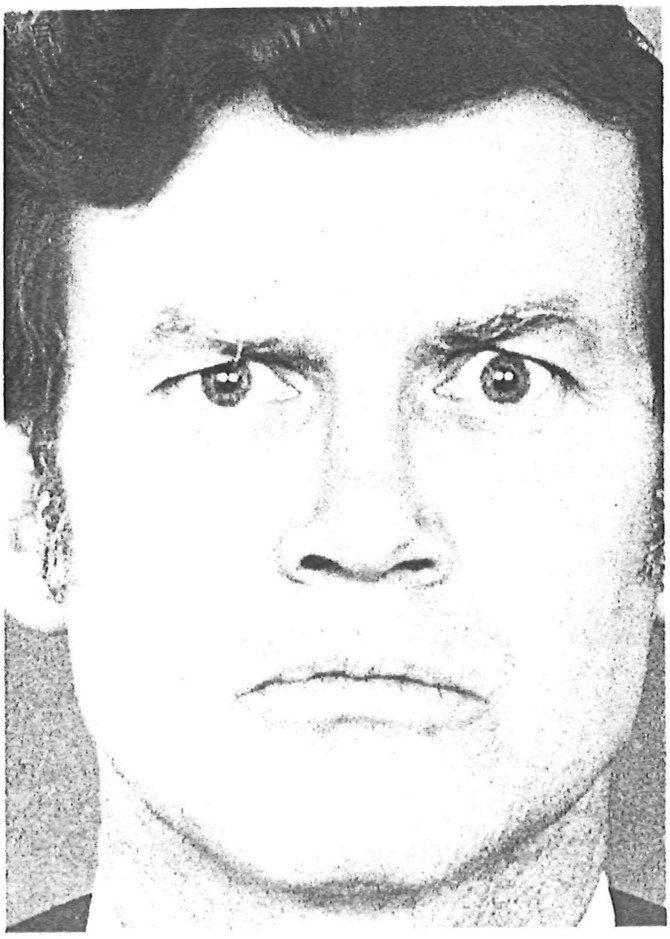


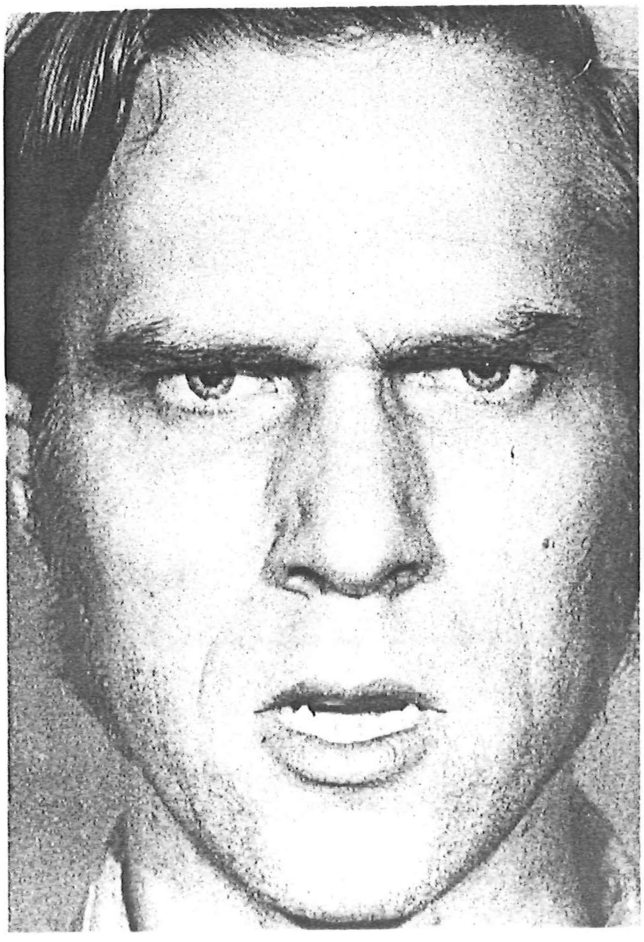


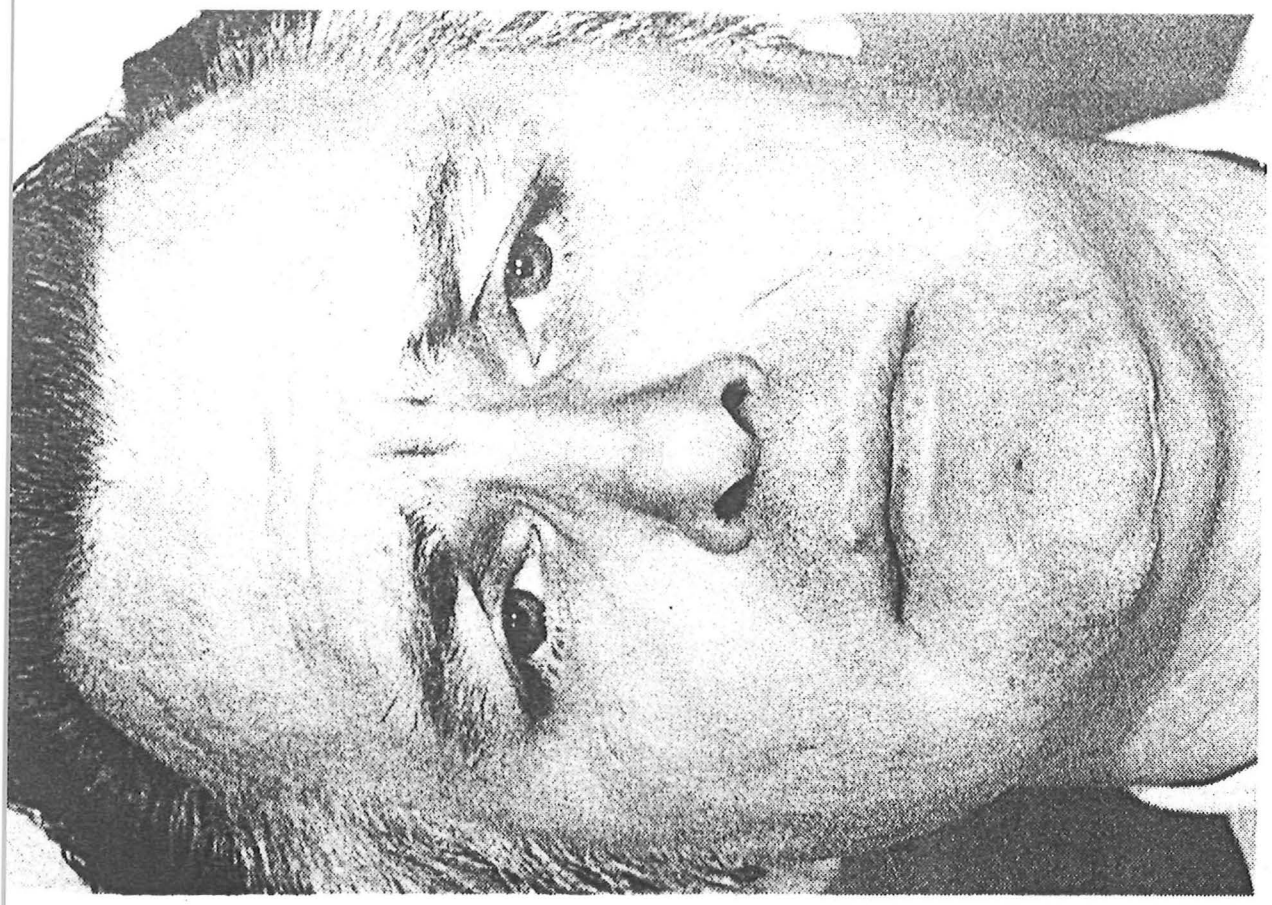


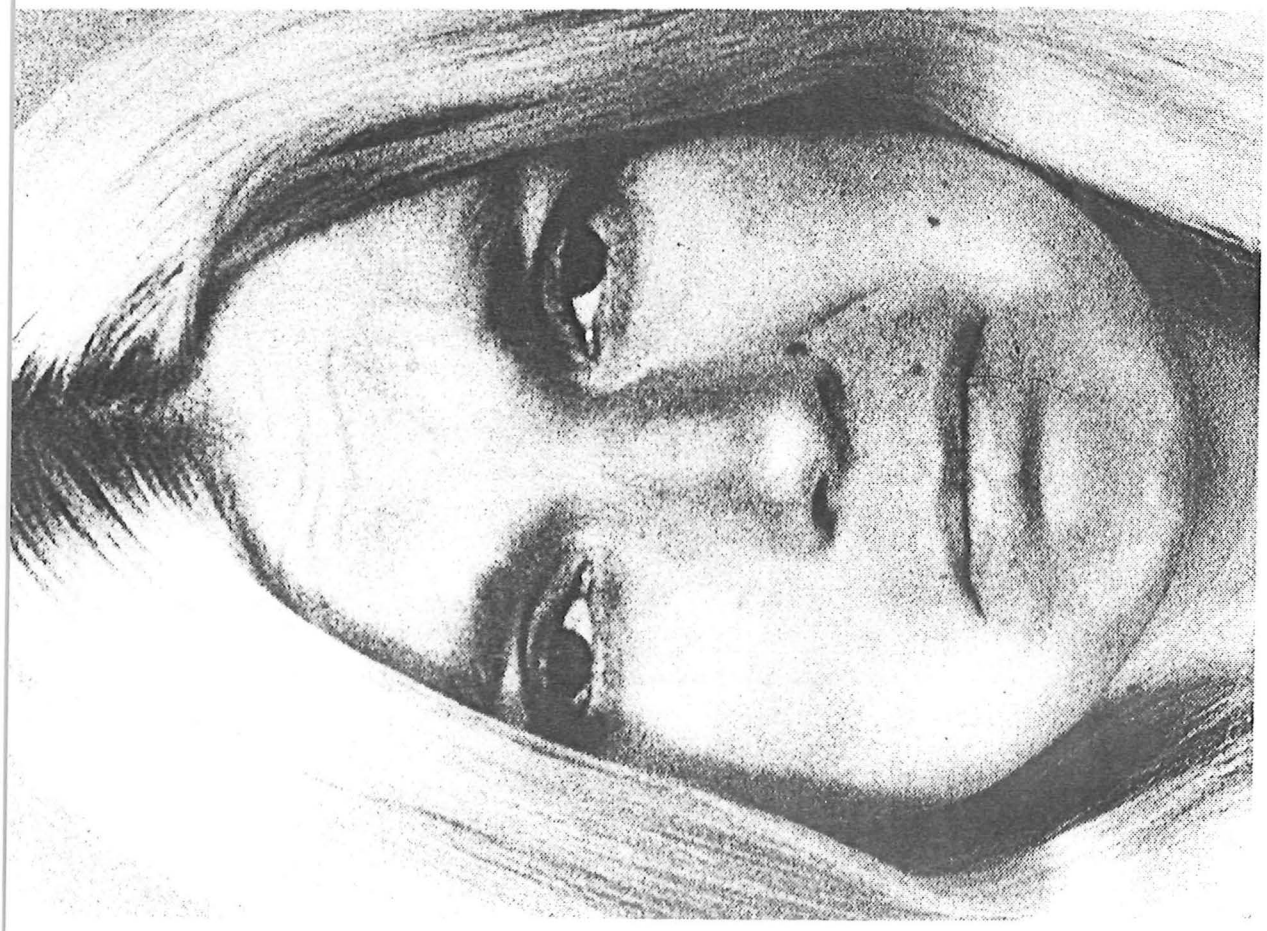


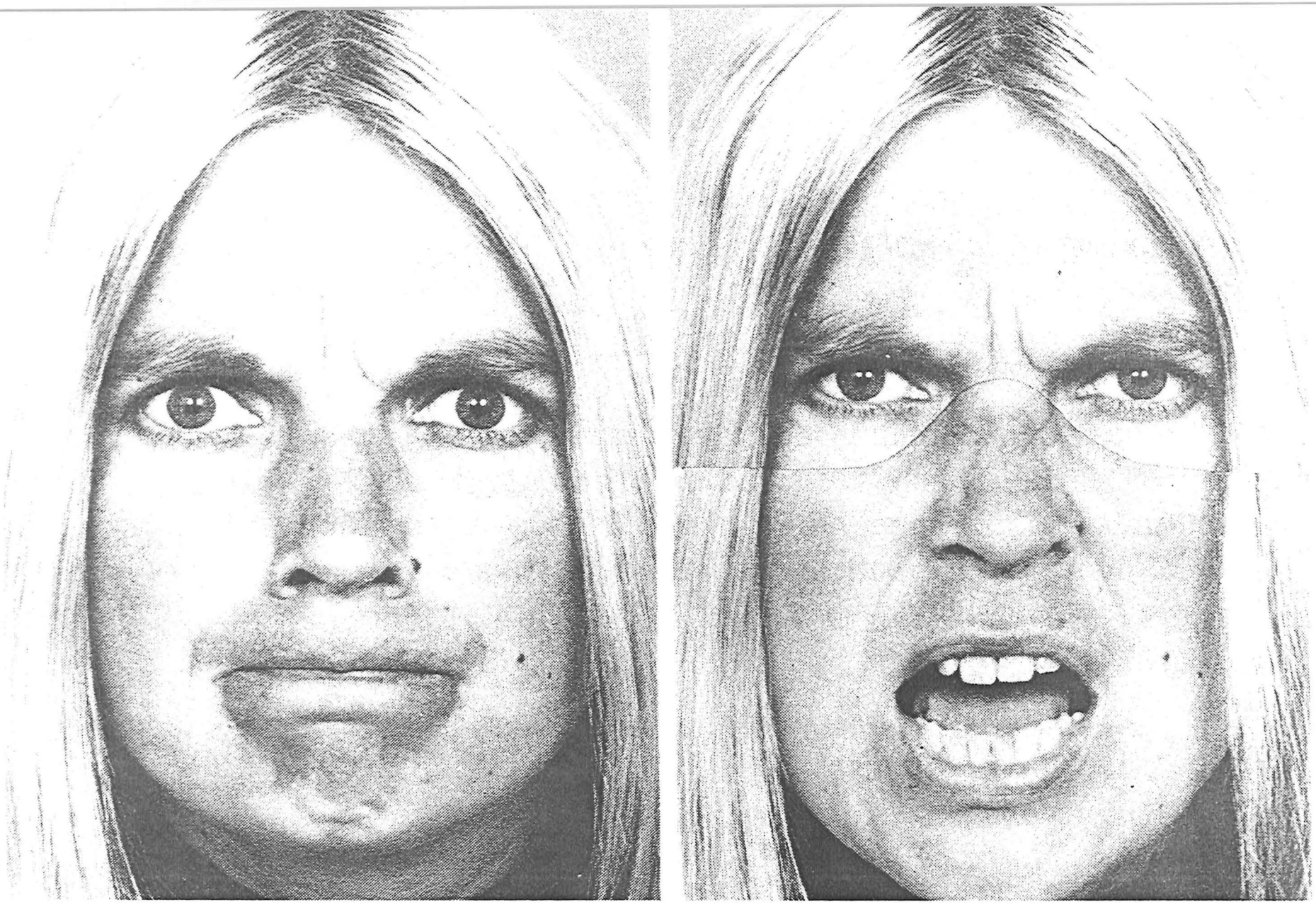


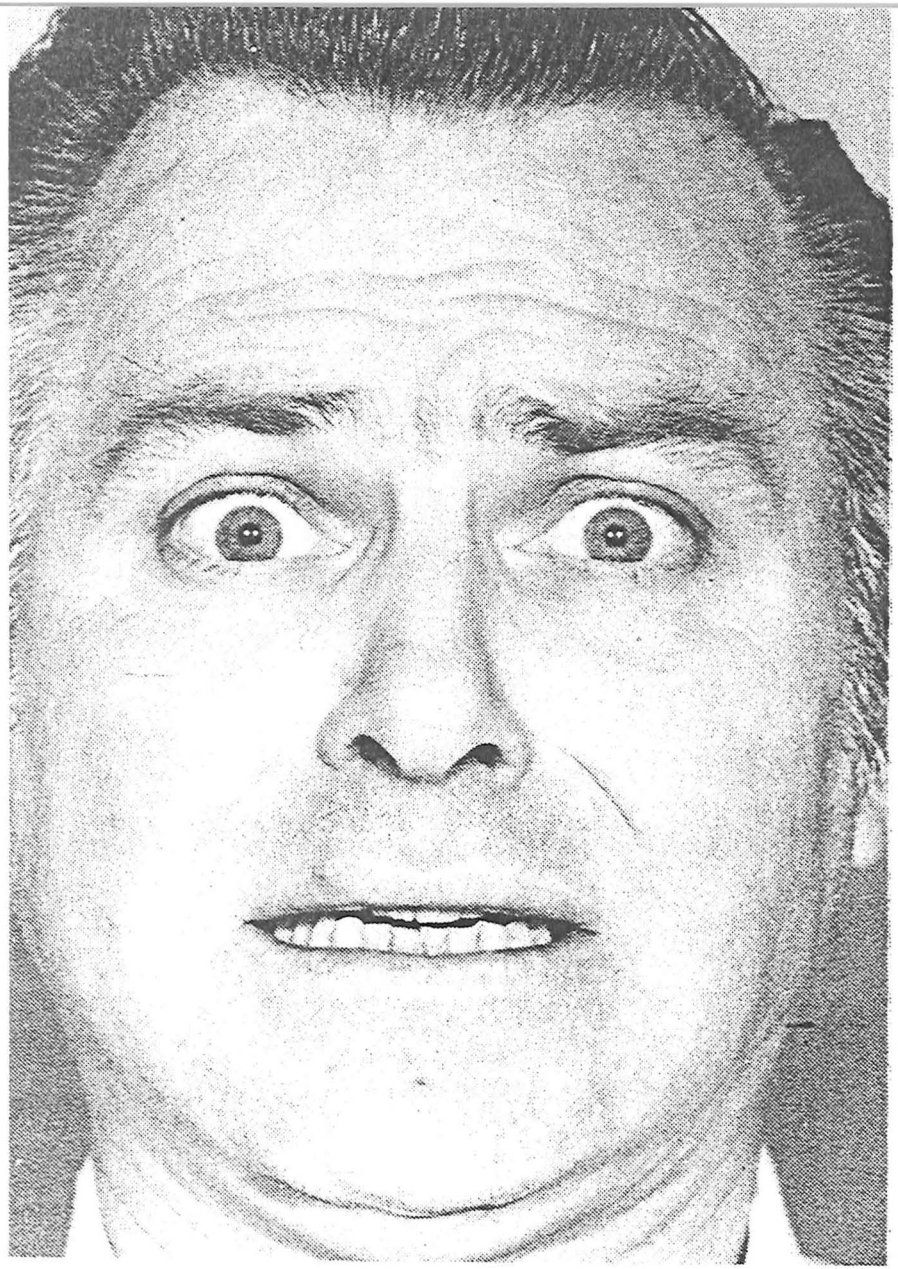


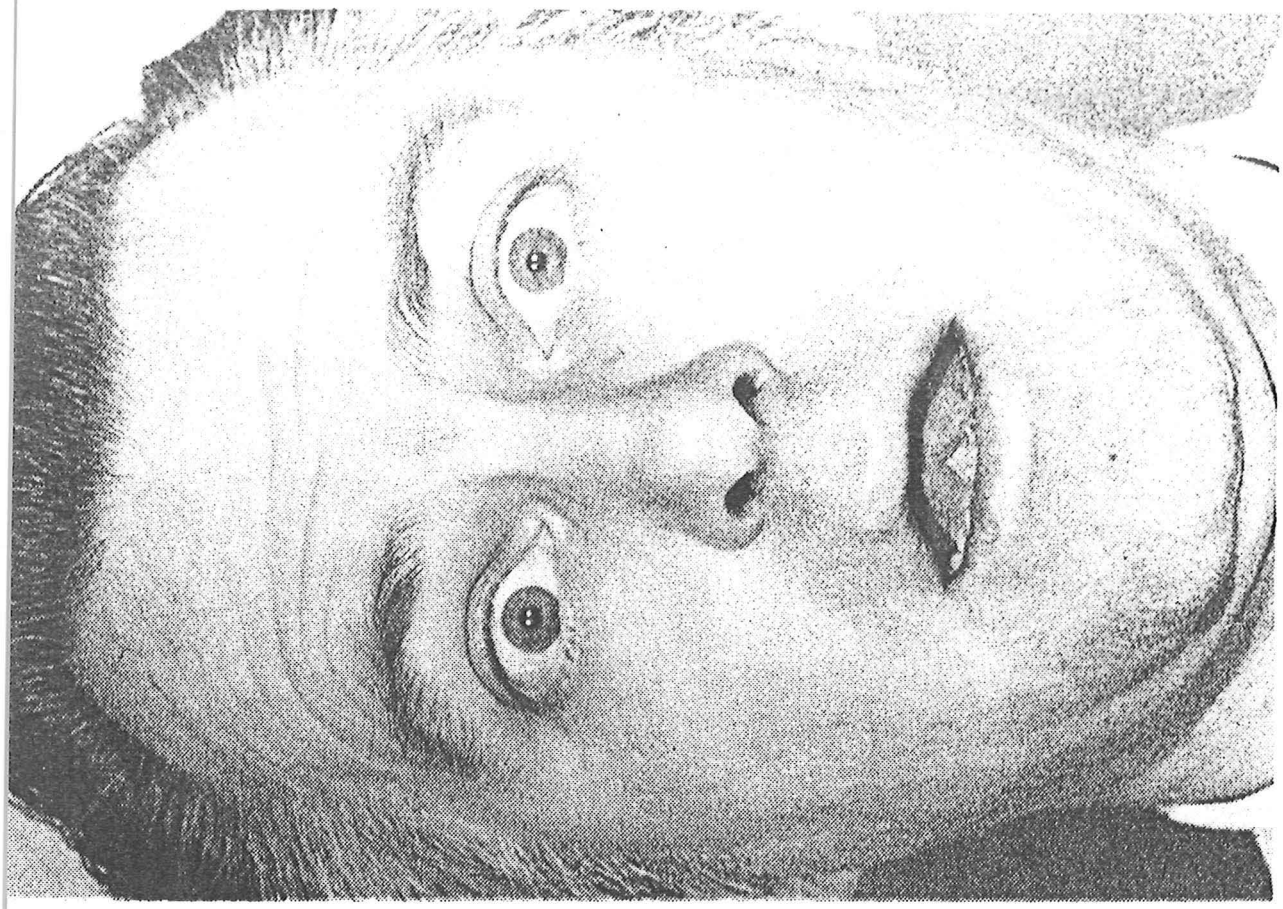


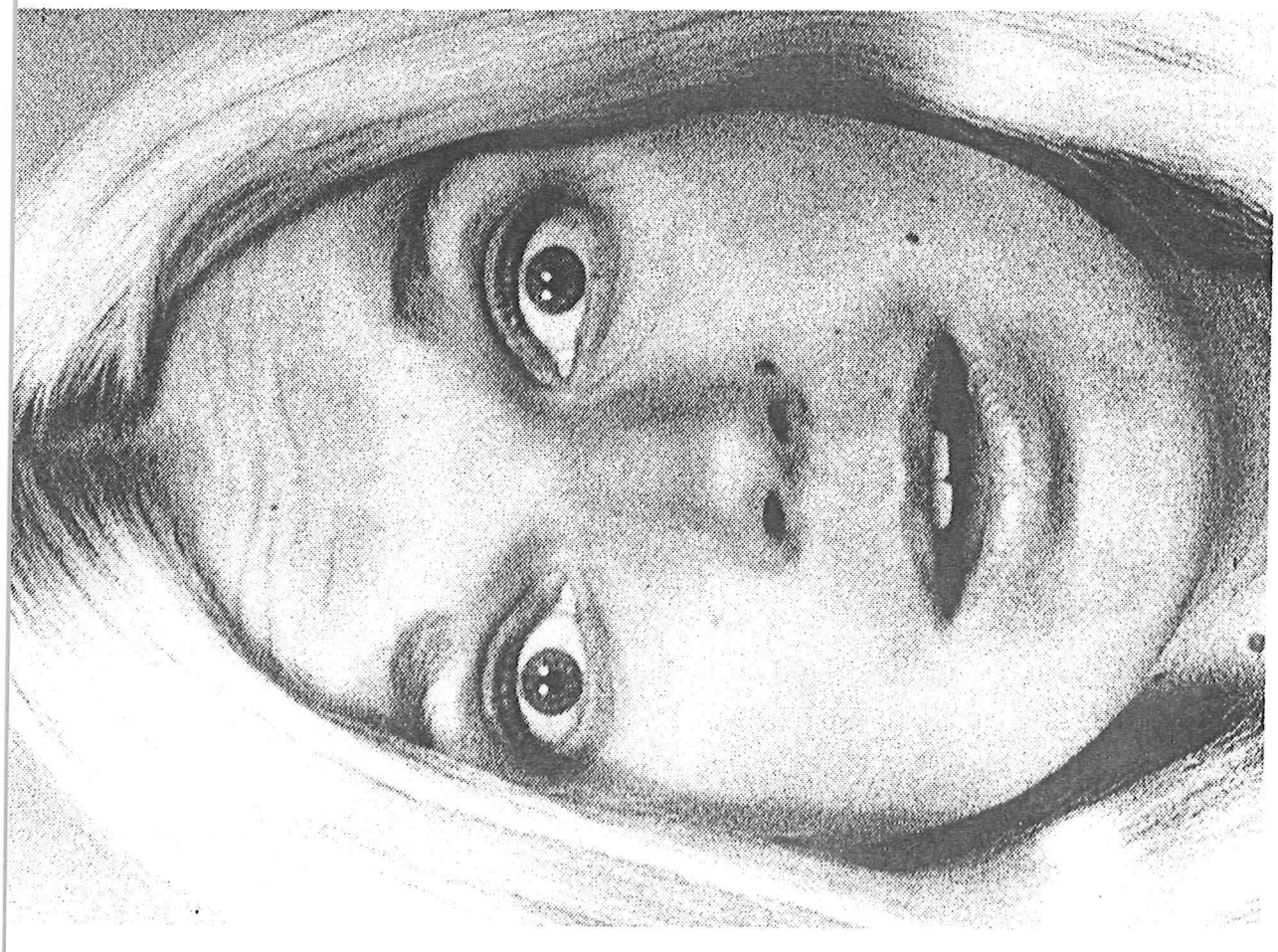


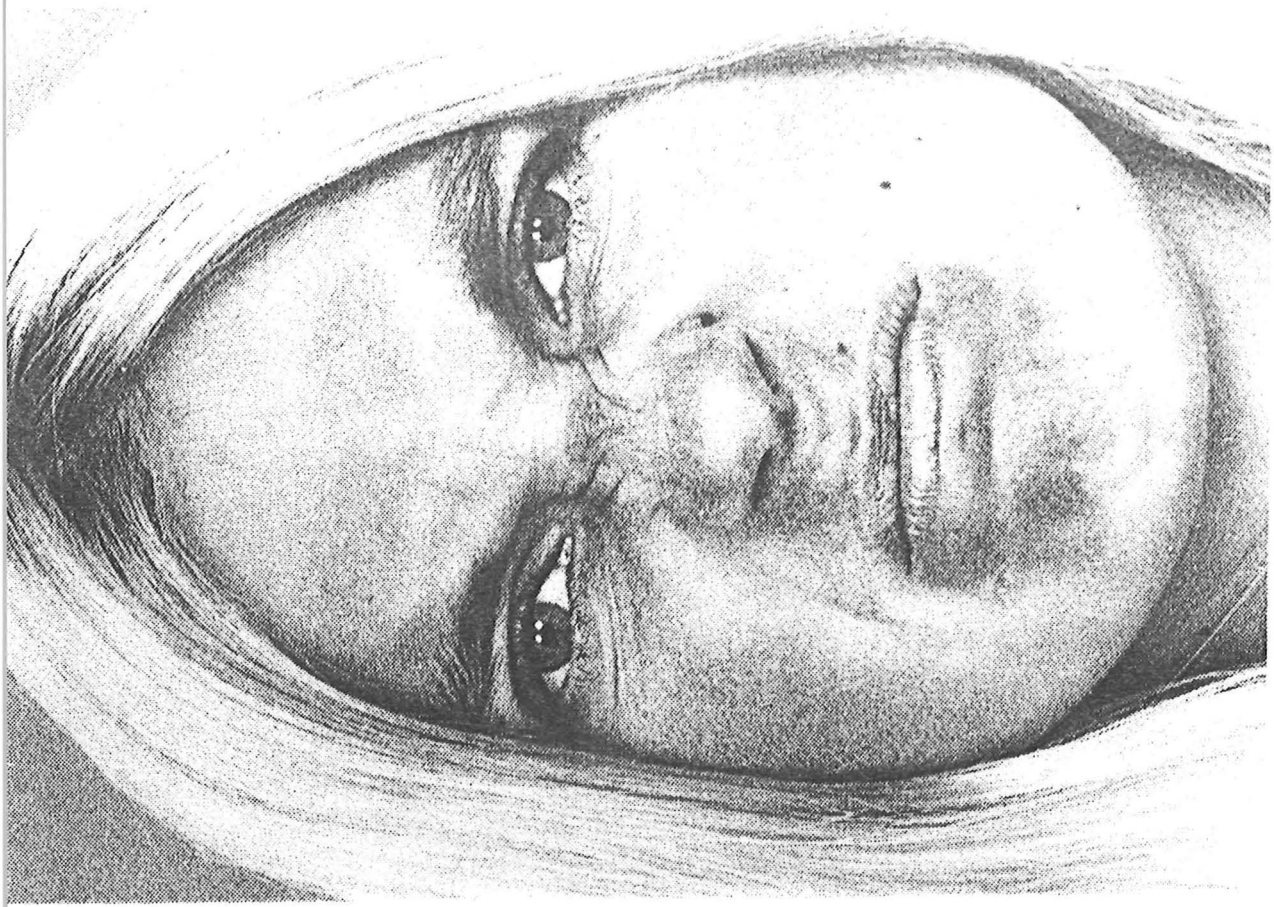


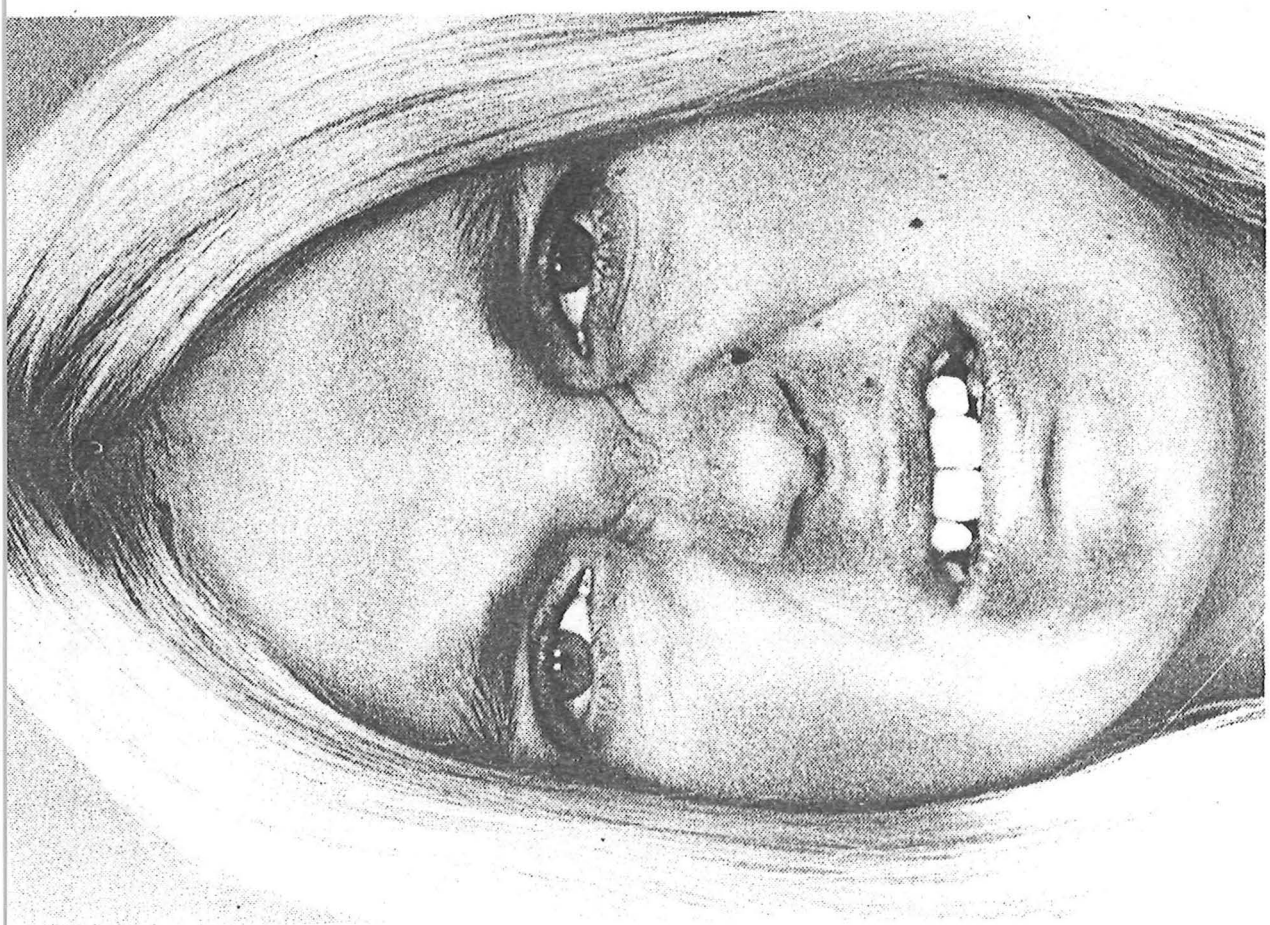


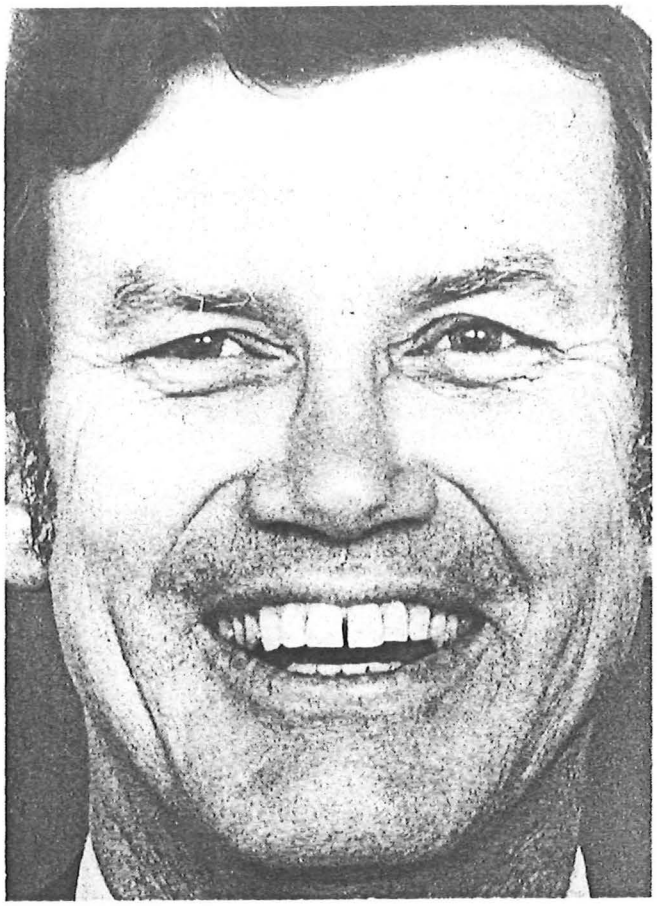


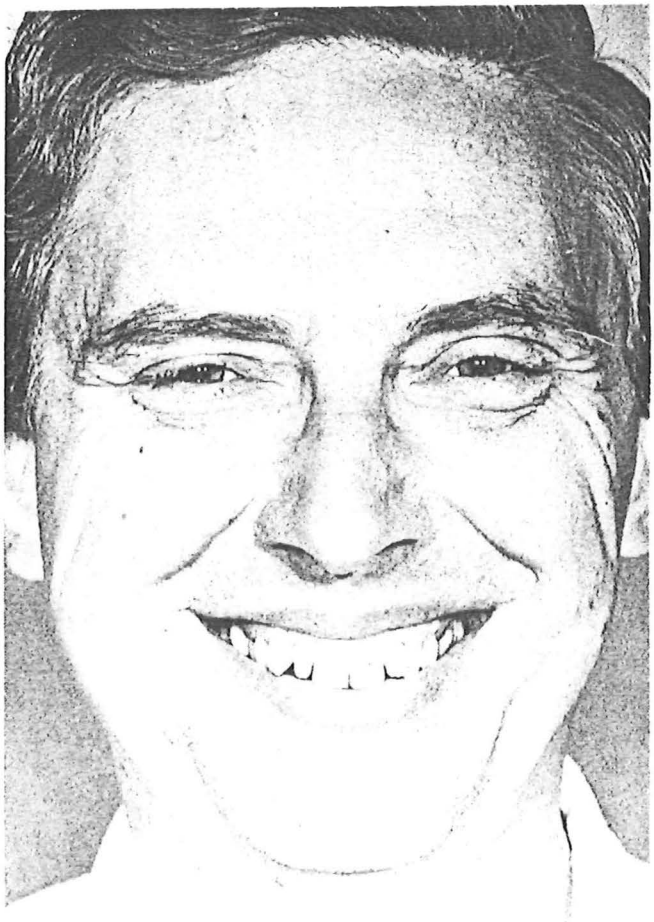












APPENDIX II

Data Sheet

SUBJECT_____

DATE_____

| NUMBER OF PHOTOGRAPH | HAPPY | SURPRISE | ANGRY | SAD | FEAR | DISGUST |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| TOTALS | | | | | | |

CORRECT OUT OF 24 =

AGE:_____ FIRST OBSERVER:_____

SEX:_____ SECOND OBSERVER:_____

OF RETARDATION RELIABILITY:_____

ETIOLOGY:_____

## APPENDIX III

### Short Stories Used In Recognition Tests

1. If a person's best friend moved away they would be very unhappy. The person would be very sad.

2. A person was driving a bus along the road when suddenly a dog ran out straight in front of the bus. The bus driver got a real surprise.

3. If a person met somebody who had not had a wash, bath and shower for a month they would smell really bad. The person would smell disgusting.

4. If you do something you are told not to do, a person will be displeased with you. The person will be angry or mad with you.

5. If a person is afraid of big dogs and one day they open their back door and find a big fierce dog running towards them, they would be very frightened or scared.

6. If a person was given a present they had always wanted for their birthday they would be glad. The person would be very happy.

APPENDIX IV

Words That Were Acceptable As Synonyms

| Happiness | Sadness |
|---|---|
| wonderful | worried |
| excited | disappointment |
| delight | sorrow |
| content | |
| pleasure | |
| cheerful | |

| Anger | Fear |
|---|---|
| mad | scared |
| cross | frightened |
| grumpy | horror |
| growling | terror |

| Surprise | Disgust |
|---|---|
| shock | awful |
| disbelief | dreadful |

APPENDIX V

## Questionnaire on Face and Context Combination

1. Do you think a single emotional expression was portrayed?

(I) YES (II) NO (III) STATE OTHERS

Please insert one of the above responses in the space immediately below, corresponding to the videos presented.

| | | | | | | |
|---|---|---|---|---|---|---|
| 1 _____ | 6 _____ | 11 _____ | 16 _____ | 21 _____ | 26 _____ | 31 _____ |
| 2 _____ | 7 _____ | 12 _____ | 17 _____ | 22 _____ | 27 _____ | 32 _____ |
| 3 _____ | 8 _____ | 13 _____ | 18 _____ | 23 _____ | 28 _____ | 33 _____ |
| 4 _____ | 9 _____ | 14 _____ | 19 _____ | 24 _____ | 29 _____ | 34 _____ |
| 5 _____ | 10 _____ | 15 _____ | 20 _____ | 25 _____ | 30 _____ | 35 _____ |

2. Which of the following emotional expressions was the subject portraying?

1. happiness 2. anger 3. surprise

4. sadness 5. fear 6. disgust

7. none of the above - write in your own suggestion

Please insert one of the above responses in the space immediately below, corresponding to the videos presented.

| | | | | | | |
|---|---|---|---|---|---|---|
| 1 _____ | 6 _____ | 11 _____ | 16 _____ | 21 _____ | 26 _____ | 31 _____ |
| 2 _____ | 7 _____ | 12 _____ | 17 _____ | 22 _____ | 27 _____ | 32 _____ |
| 3 _____ | 8 _____ | 13 _____ | 18 _____ | 23 _____ | 28 _____ | 33 _____ |
| 4 _____ | 9 _____ | 14 _____ | 19 _____ | 24 _____ | 29 _____ | 34 _____ |
| 5 _____ | 10 _____ | 15 _____ | 20 _____ | 25 _____ | 30 _____ | 35 _____ |

3. On a scale of 1 to 7 how well do you think emotion was portrayed?

1 2 3 4 5 6 7
poorly very well

Please insert chosen number immediately below, corresponding to the vidoes presented.

| | | | | | | |
|---|---|---|---|---|---|---|
| 1 _____ | 6 _____ | 11 _____ | 16 _____ | 21 _____ | 26 _____ | 31 _____ |
| 2 _____ | 7 _____ | 12 _____ | 17 _____ | 22 _____ | 27 _____ | 32 _____ |
| 3 _____ | 8 _____ | 13 _____ | 18 _____ | 23 _____ | 28 _____ | 33 _____ |
| 4 _____ | 9 _____ | 14 _____ | 19 _____ | 24 _____ | 29 _____ | 34 _____ |
| 5 _____ | 10 _____ | 15 _____ | 20 _____ | 25 _____ | 30 _____ | 35 _____ |

4. On a scale of 1 to 7 how intense would you rate the emotion portrayed?

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|
| weak | | | | | | strong |

Please insert chosen number immediately below, corresponding to the videos presented.

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | _____ | 6 | _____ | 11 | _____ | 16 | _____ | 21 | _____ | 26 | _____ | 31 | _____ |
| 2 | _____ | 7 | _____ | 12 | _____ | 17 | _____ | 22 | _____ | 27 | _____ | 32 | _____ |
| 3 | _____ | 8 | _____ | 13 | _____ | 18 | _____ | 23 | _____ | 28 | _____ | 33 | _____ |
| 4 | _____ | 9 | _____ | 14 | _____ | 19 | _____ | 24 | _____ | 29 | _____ | 34 | _____ |
| 5 | _____ | 10 | _____ | 15 | _____ | 20 | _____ | 25 | _____ | 30 | _____ | 35 | _____ |

5. To what extent do you think factors other than facial expression and context (language) influenced your decision in deciding what emotion was portrayed? (e.g., body movement, setting etc.) Please insert chosen number immediately below, corresponding to the videos presented.

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|
| not at all | | | | | | a lot |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | _____ | 6 | _____ | 11 | _____ | 16 | _____ | 21 | _____ | 26 | _____ | 31 | _____ |
| 2 | _____ | 7 | _____ | 12 | _____ | 17 | _____ | 22 | _____ | 27 | _____ | 32 | _____ |
| 3 | _____ | 8 | _____ | 13 | _____ | 18 | _____ | 23 | _____ | 28 | _____ | 33 | _____ |
| 4 | _____ | 9 | _____ | 14 | _____ | 19 | _____ | 24 | _____ | 29 | _____ | 34 | _____ |
| 5 | _____ | 10 | _____ | 15 | _____ | 20 | _____ | 25 | _____ | 30 | _____ | 35 | _____ |

6. How typical of everyday life situations would you rate the role play just observed?

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|
| observed rarely | | | | | | observed frequently |

Please insert the chosen number immediately below, corresponding to the videos presented.

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | _____ | 6 | _____ | 11 | _____ | 16 | _____ | 21 | _____ | 26 | _____ | 31 | _____ |
| 2 | _____ | 7 | _____ | 12 | _____ | 17 | _____ | 22 | _____ | 27 | _____ | 32 | _____ |
| 3 | _____ | 8 | _____ | 13 | _____ | 18 | _____ | 23 | _____ | 28 | _____ | 33 | _____ |
| 4 | _____ | 9 | _____ | 14 | _____ | 19 | _____ | 24 | _____ | 29 | _____ | 34 | _____ |
| 5 | _____ | 10 | _____ | 15 | _____ | 20 | _____ | 25 | _____ | 30 | _____ | 35 | _____ |

Questionnaire on Face and Context Combination

1. Do you think a single emotional expression was portrayed?

(I) YES (II) NO (III) STATE OTHERS

Please insert one of the above responses in the space immediately below, corresponding to the videos presented.

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 36 | _____ | 41 | _____ | 46 | _____ | 51 | _____ | 56 | _____ | 61 | _____ | 66 | _____ |
| 37 | _____ | 42 | _____ | 47 | _____ | 52 | _____ | 57 | _____ | 62 | _____ | 67 | _____ |
| 38 | _____ | 43 | _____ | 48 | _____ | 53 | _____ | 58 | _____ | 63 | _____ | 68 | _____ |
| 39 | _____ | 44 | _____ | 49 | _____ | 54 | _____ | 59 | _____ | 64 | _____ | 69 | _____ |
| 40 | _____ | 45 | _____ | 50 | _____ | 55 | _____ | 60 | _____ | 65 | _____ | 70 | _____ |

2. Which of the following emotional expressions was the subject portraying?

1. happiness 2. anger 3. surprise

4. sadness 5. fear 6. disgust

7. none of the above - write in your own suggestion

Please insert one of the above responses in the space immediately below, corresponding to the videos presented.

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 36 | _____ | 41 | _____ | 46 | _____ | 51 | _____ | 56 | _____ | 61 | _____ | 66 | _____ |
| 37 | _____ | 42 | _____ | 47 | _____ | 52 | _____ | 57 | _____ | 62 | _____ | 67 | _____ |
| 38 | _____ | 43 | _____ | 48 | _____ | 53 | _____ | 58 | _____ | 63 | _____ | 68 | _____ |
| 39 | _____ | 44 | _____ | 49 | _____ | 54 | _____ | 59 | _____ | 64 | _____ | 69 | _____ |
| 40 | _____ | 45 | _____ | 50 | _____ | 55 | _____ | 60 | _____ | 65 | _____ | 70 | _____ |

3. On a scale of 1 to 7 how well do you think the emotion was portrayed?

1 2 3 4 5 6 7
poorly very well

Please insert chosen number immediately below, corresponding to the videos presented.

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 36 | _____ | 41 | _____ | 46 | _____ | 51 | _____ | 56 | _____ | 61 | _____ | 66 | _____ |
| 37 | _____ | 42 | _____ | 47 | _____ | 52 | _____ | 57 | _____ | 62 | _____ | 67 | _____ |
| 38 | _____ | 43 | _____ | 48 | _____ | 53 | _____ | 58 | _____ | 63 | _____ | 68 | _____ |
| 39 | _____ | 44 | _____ | 49 | _____ | 54 | _____ | 59 | _____ | 64 | _____ | 69 | _____ |
| 40 | _____ | 45 | _____ | 50 | _____ | 55 | _____ | 60 | _____ | 65 | _____ | 70 | _____ |

4. On a scale of 1 to 7 how intense would you rate the emotion portrayed?

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|
| weak | | | | | | strong |

Please insert chosen number immediately below, corresponding to the videos presented.

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 36 | _____ | 41 | _____ | 46 | _____ | 51 | _____ | 56 | _____ | 61 | _____ | 66 | _____ |
| 37 | _____ | 42 | _____ | 47 | _____ | 52 | _____ | 57 | _____ | 62 | _____ | 67 | _____ |
| 38 | _____ | 43 | _____ | 48 | _____ | 53 | _____ | 58 | _____ | 63 | _____ | 68 | _____ |
| 39 | _____ | 44 | _____ | 49 | _____ | 54 | _____ | 59 | _____ | 64 | _____ | 69 | _____ |
| 40 | _____ | 45 | _____ | 50 | _____ | 55 | _____ | 60 | _____ | 65 | _____ | 70 | _____ |

5. To what extent do you think factors other than facial expression and context (language) influenced your decision in deciding what emotion was portrayed? (e.g., body movement, setting etc.) Please insert chosen number immediately below, corresponding to the videos presented.

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|
| not at all | | | | | | a lot |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 36 | _____ | 41 | _____ | 46 | _____ | 51 | _____ | 56 | _____ | 61 | _____ | 66 | _____ |
| 37 | _____ | 42 | _____ | 47 | _____ | 52 | _____ | 57 | _____ | 62 | _____ | 67 | _____ |
| 38 | _____ | 43 | _____ | 48 | _____ | 53 | _____ | 58 | _____ | 63 | _____ | 68 | _____ |
| 39 | _____ | 44 | _____ | 49 | _____ | 54 | _____ | 59 | _____ | 64 | _____ | 69 | _____ |
| 40 | _____ | 45 | _____ | 50 | _____ | 55 | _____ | 60 | _____ | 65 | _____ | 70 | _____ |

6. How typical of everyday life situations would you rate the role play just observed?

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|
| observed rarely | | | | | | observed frequantly |

Please insert the chosen number immediately below, corresponding to the viedos presented.

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 36 | _____ | 41 | _____ | 46 | _____ | 51 | _____ | 56 | _____ | 61 | _____ | 66 | _____ |
| 37 | _____ | 42 | _____ | 47 | _____ | 52 | _____ | 57 | _____ | 62 | _____ | 67 | _____ |
| 38 | _____ | 43 | _____ | 48 | _____ | 53 | _____ | 58 | _____ | 63 | _____ | 68 | _____ |
| 39 | _____ | 44 | _____ | 49 | _____ | 54 | _____ | 59 | _____ | 64 | _____ | 69 | _____ |
| 40 | _____ | 45 | _____ | 50 | _____ | 55 | _____ | 60 | _____ | 65 | _____ | 70 | _____ |

Judge's Questionnaire

Name
Age
Date

1. Do you think the subject portrayed a single facial expression of emotion?

(I) YES (II) NO (III) STATE OTHERS

Please insert one of the above responses in the space immediately below, corresponding to the videos presented.

| | | | | | | |
|---|---|---|---|---|---|---|
| 1 _____ | 6 _____ | 11 _____ | 16 _____ | 21 _____ | 26 _____ | 31 _____ |
| 2 _____ | 7 _____ | 12 _____ | 17 _____ | 22 _____ | 27 _____ | 32 _____ |
| 3 _____ | 8 _____ | 13 _____ | 18 _____ | 23 _____ | 28 _____ | 33 _____ |
| 4 _____ | 9 _____ | 14 _____ | 19 _____ | 24 _____ | 29 _____ | 34 _____ |
| 5 _____ | 10 _____ | 15 _____ | 20 _____ | 25 _____ | 30 _____ | 25 _____ |

2. Which of the following facial expressions of emotion was the subject portraying?

1. happiness 2. sadness 3. anger
4. surprise 5. disgust 6. fear
7. None of the above - write in your own suggestion.

Please insert one of the above responses in the space immediately below, corresponding to the videos presented.

| | | | | | | |
|---|---|---|---|---|---|---|
| 1 _____ | 6 _____ | 11 _____ | 16 _____ | 21 _____ | 26 _____ | 31 _____ |
| 2 _____ | 7 _____ | 12 _____ | 17 _____ | 22 _____ | 27 _____ | 32 _____ |
| 3 _____ | 8 _____ | 13 _____ | 18 _____ | 23 _____ | 28 _____ | 33 _____ |
| 4 _____ | 9 _____ | 14 _____ | 19 _____ | 24 _____ | 29 _____ | 34 _____ |
| 5 _____ | 10 _____ | 15 _____ | 20 _____ | 25 _____ | 30 _____ | 35 _____ |

3. On a scale of 1 to 7 how well do you think the subject portrayed the emotional expression?

1 2 3 4 5 6 7
poorly very well

Please insert chosen number immediately below, corresponding to the videos presented

| | | | | | | |
|---|---|---|---|---|---|---|
| 1 _____ | 6 _____ | 11 _____ | 16 _____ | 21 _____ | 26 _____ | 31 _____ |
| 2 _____ | 7 _____ | 12 _____ | 17 _____ | 22 _____ | 27 _____ | 32 _____ |
| 3 _____ | 8 _____ | 13 _____ | 18 _____ | 23 _____ | 28 _____ | 33 _____ |
| 4 _____ | 9 _____ | 14 _____ | 19 _____ | 24 _____ | 29 _____ | 34 _____ |
| 5 _____ | 10 _____ | 15 _____ | 20 _____ | 25 _____ | 30 _____ | 35 _____ |

4. On a scale of 1 to 7 how intense would you rate the facial expression of emotion?

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|
| weak | | | | | | strong |

Please insert chosen number immediately below, corresponding to the videos presented.

| | | | | | | |
|---|---|---|---|---|---|---|
| 1 _____ | 6 _____ | 11 _____ | 16 _____ | 21 _____ | 26 _____ | 31 _____ |
| 2 _____ | 7 _____ | 12 _____ | 17 _____ | 22 _____ | 27 _____ | 32 _____ |
| 3 _____ | 8 _____ | 13 _____ | 18 _____ | 23 _____ | 28 _____ | 33 _____ |
| 4 _____ | 9 _____ | 14 _____ | 19 _____ | 24 _____ | 29 _____ | 34 _____ |
| 5 _____ | 10 _____ | 15 _____ | 20 _____ | 25 _____ | 30 _____ | 35 _____ |

Judges Questionnaire

Name
Age
Date

1. Do you think the subject portrayed a single facial expression of emotion?

(I) YES (II) NO (III) STATE OTHERS

Please insert one of the above responses in the space immediately below, corresponding to the videos presented.

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 36 | _____ | 41 | _____ | 46 | _____ | 51 | _____ | 56 | _____ |
| 61 | _____ | 66 | _____ | | | | | | |
| 37 | _____ | 42 | _____ | 47 | _____ | 52 | _____ | 57 | _____ |
| 62 | _____ | 67 | _____ | | | | | | |
| 38 | _____ | 43 | _____ | 48 | _____ | 53 | _____ | 58 | _____ |
| 63 | _____ | 68 | _____ | | | | | | |
| 39 | _____ | 44 | _____ | 49 | _____ | 54 | _____ | 59 | _____ |
| 64 | _____ | 69 | _____ | | | | | | |
| 40 | _____ | 45 | _____ | 50 | _____ | 55 | _____ | 60 | _____ |
| 65 | _____ | 70 | _____ | | | | | | |

2. Which of the following facial expressions of emotion was the subject portraying?

1. happiness 2. sadness 3. anger
4. surprise 5. disgust 6. fear
7. none of the above - write in your own suggestion

Please insert one of the above responses in the space immediately below, corresponding to the videos presented.

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 36 | _____ | 41 | _____ | 46 | _____ | 51 | _____ | 56 | _____ |
| 61 | _____ | 66 | _____ | | | | | | |
| 37 | _____ | 42 | _____ | 47 | _____ | 52 | _____ | 57 | _____ |
| 62 | _____ | 67 | _____ | | | | | | |
| 38 | _____ | 43 | _____ | 48 | _____ | 53 | _____ | 58 | _____ |
| 63 | _____ | 68 | _____ | | | | | | |
| 39 | _____ | 44 | _____ | 49 | _____ | 54 | _____ | 59 | _____ |
| 64 | _____ | 69 | _____ | | | | | | |
| 40 | _____ | 45 | _____ | 50 | _____ | 55 | _____ | 60 | _____ |
| 65 | _____ | 70 | _____ | | | | | | |

3. On a scale of 1 to 7 how well do you think the subject portrayed the emotional expression?

1 2 3 4 5 6 7
poorly very well

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 36 | _____ | 41 | _____ | 46 | _____ | 51 | _____ | 56 | _____ |
| 61 | _____ | 66 | _____ | | | | | | |
| 37 | _____ | 42 | _____ | 47 | _____ | 52 | _____ | 57 | _____ |
| 62 | _____ | 67 | _____ | | | | | | |
| 38 | _____ | 43 | _____ | 48 | _____ | 53 | _____ | 58 | _____ |
| 63 | _____ | 68 | _____ | | | | | | |
| 39 | _____ | 44 | _____ | 49 | _____ | 54 | _____ | 59 | _____ |
| 64 | _____ | 69 | _____ | | | | | | |
| 40 | _____ | 45 | _____ | 50 | _____ | 55 | _____ | 60 | _____ |
| 65 | _____ | 70 | _____ | | | | | | |

4. On a scale of 1 to 7 how intense would you rate the facial expression of emotion?

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|
| weak | | | | | | strong |

Please insert chosen number below, corresponding to the videos presented.

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 36 | _____ | 41 | _____ | 46 | _____ | 51 | _____ | 56 | _____ | 61 | _____ | 66 | _____ |
| 37 | _____ | 42 | _____ | 47 | _____ | 52 | _____ | 57 | _____ | 62 | _____ | 67 | _____ |
| 38 | _____ | 43 | _____ | 48 | _____ | 53 | _____ | 58 | _____ | 63 | _____ | 68 | _____ |
| 39 | _____ | 44 | _____ | 49 | _____ | 54 | _____ | 59 | _____ | 64 | _____ | 69 | _____ |
| 40 | _____ | 45 | _____ | 50 | _____ | 55 | _____ | 60 | _____ | 65 | _____ | 70 | _____ |

Judge's Questionnaire - Contextual Information

1. From the available contextual information (language), which emotion(s) do you think the subject was portraying?

1. happiness 2. anger 3. surprise
4. sadness 5. fear 6. disgust
7. none of the above - write in your own suggestion.

Please insert one of the above responses in the space immediately below, corresponding to the videos presented.

| | | | | | | |
|---|---|---|---|---|---|---|
| 1 _____ | 6 _____ | 11 _____ | 16 _____ | 21 _____ | 26 _____ | 31 _____ |
| 2 _____ | 7 _____ | 12 _____ | 17 _____ | 22 _____ | 27 _____ | 32 _____ |
| 3 _____ | 8 _____ | 13 _____ | 18 _____ | 23 _____ | 28 _____ | 33 _____ |
| 4 _____ | 9 _____ | 14 _____ | 19 _____ | 24 _____ | 29 _____ | 34 _____ |
| 5 _____ | 10 _____ | 15 _____ | 20 _____ | 25 _____ | 30 _____ | 35 _____ |

2. As a clue to the emotion portrayed, how influencial was contextual information (language)?

1 2 3 4 5 6 7
little very

Please insert chosen number immediately below, corresponding to the videos presented.

| | | | | | | |
|---|---|---|---|---|---|---|
| 1 _____ | 6 _____ | 11 _____ | 16 _____ | 21 _____ | 26 _____ | 31 _____ |
| 2 _____ | 7 _____ | 12 _____ | 17 _____ | 22 _____ | 27 _____ | 32 _____ |
| 3 _____ | 8 _____ | 13 _____ | 18 _____ | 23 _____ | 28 _____ | 33 _____ |
| 4 _____ | 9 _____ | 14 _____ | 19 _____ | 24 _____ | 29 _____ | 34 _____ |
| 5 _____ | 10 _____ | 15 _____ | 20 _____ | 25 _____ | 30 _____ | 35 _____ |

3. How intense would you rate the contextual information (language)?

1 2 3 4 5 6 7
little very

Please insert chosen number immediately below, corresponding to the videos presented.

| | | | | | | |
|---|---|---|---|---|---|---|
| 1 _____ | 6 _____ | 11 _____ | 16 _____ | 21 _____ | 26 _____ | 31 _____ |
| 2 _____ | 7 _____ | 12 _____ | 17 _____ | 22 _____ | 27 _____ | 32 _____ |
| 3 _____ | 8 _____ | 13 _____ | 18 _____ | 23 _____ | 28 _____ | 33 _____ |
| 4 _____ | 9 _____ | 14 _____ | 19 _____ | 24 _____ | 29 _____ | 34 _____ |
| 5 _____ | 10 _____ | 15 _____ | 20 _____ | 25 _____ | 30 _____ | 35 _____ |

Judges Questionnaire - Contextual

1. From the available contextual information (language), which emotion(s) do you think the subject was portraying?

| | | | | | |
|---|---|---|---|---|---|
| 1. | happiness | 2. | anger | 3. | surprise |
| 2. | sadness | 5. | fear | 6. | disgust |

7. none of the above - write in your own suggestion.

Please insert one of the above responses in the space immediately below, corresponding to the videos presented.

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 36 | _____ | 41 | _____ | 46 | _____ | 51 | _____ | 56 | _____ |
| 37 | _____ | 42 | _____ | 47 | _____ | 52 | _____ | 57 | _____ |
| 38 | _____ | 43 | _____ | 48 | _____ | 53 | _____ | 58 | _____ |
| 39 | _____ | 44 | _____ | 49 | _____ | 54 | _____ | 59 | _____ |
| 40 | _____ | 45 | _____ | 50 | _____ | 55 | _____ | 60 | _____ |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 61 | _____ | 66 | _____ | | | | | | |
| 62 | _____ | 67 | _____ | | | | | | |
| 63 | _____ | 68 | _____ | | | | | | |
| 64 | _____ | 69 | _____ | | | | | | |
| 65 | _____ | 70 | _____ | | | | | | |

2. As a clue, to the emotion portrayed, how influencial was contextual information (language)?

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|
| little | | | | | | very |

Please insert chosen number immediately below, corresponding to the videos presented.

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 36 | _____ | 41 | _____ | 46 | _____ | 51 | _____ | 56 | _____ |
| 37 | _____ | 42 | _____ | 47 | _____ | 52 | _____ | 57 | _____ |
| 38 | _____ | 43 | _____ | 48 | _____ | 53 | _____ | 58 | _____ |
| 39 | _____ | 44 | _____ | 49 | _____ | 54 | _____ | 59 | _____ |
| 40 | _____ | 45 | _____ | 50 | _____ | 55 | _____ | 60 | _____ |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 61 | _____ | 66 | _____ | | | | | | |
| 62 | _____ | 67 | _____ | | | | | | |
| 63 | _____ | 68 | _____ | | | | | | |
| 64 | _____ | 69 | _____ | | | | | | |
| 65 | _____ | 70 | _____ | | | | | | |

3. How intense would you rate the contextual information (language)?

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|
| little | | | | | | very |

Please insert chosen number immediately below, corresponding to the videos presented.

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 36 | _____ | 41 | _____ | 46 | _____ | 51 | _____ | 56 | _____ |
| 37 | _____ | 42 | _____ | 47 | _____ | 52 | _____ | 57 | _____ |
| 38 | _____ | 43 | _____ | 48 | _____ | 53 | _____ | 58 | _____ |
| 39 | _____ | 44 | _____ | 49 | _____ | 54 | _____ | 59 | _____ |
| 40 | _____ | 45 | _____ | 50 | _____ | 55 | _____ | 60 | _____ |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 61 | _____ | 66 | _____ | | | | | | |
| 62 | _____ | 67 | _____ | | | | | | |
| 63 | _____ | 68 | _____ | | | | | | |
| 64 | _____ | 69 | _____ | | | | | | |
| 65 | _____ | 70 | _____ | | | | | | |